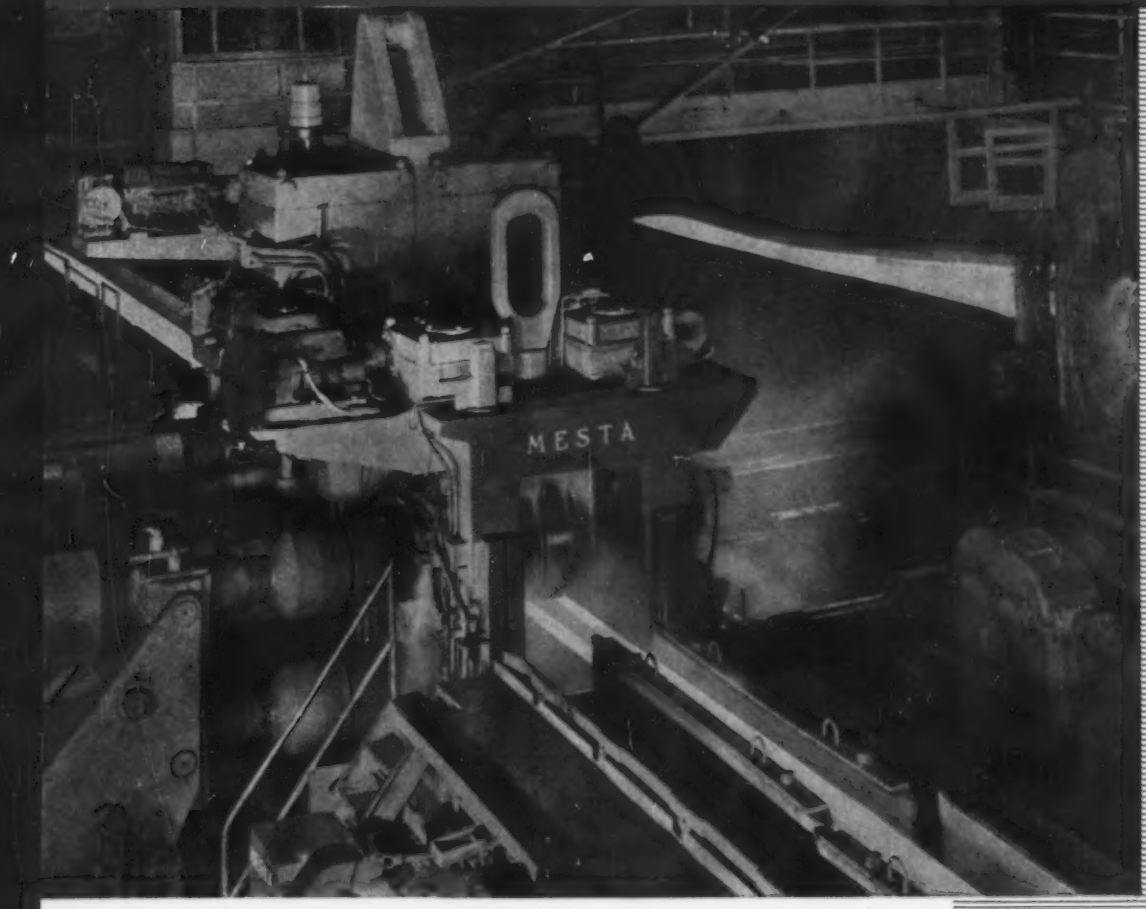
The IRON AGE
December 11, 1958 A Chilton Publication The National Metalworking Weekly

More for Your Nonferrous Castings Dollar P. 121

Are Consumers In A Spending Mood? – P. 89
Control Makers Try to Shave Prices – P. 162
Digest of the Week – P. 2-3

WIDE FLANGE BEAM AND STRUCTURAL MILLS

Designed and Built by MESTA



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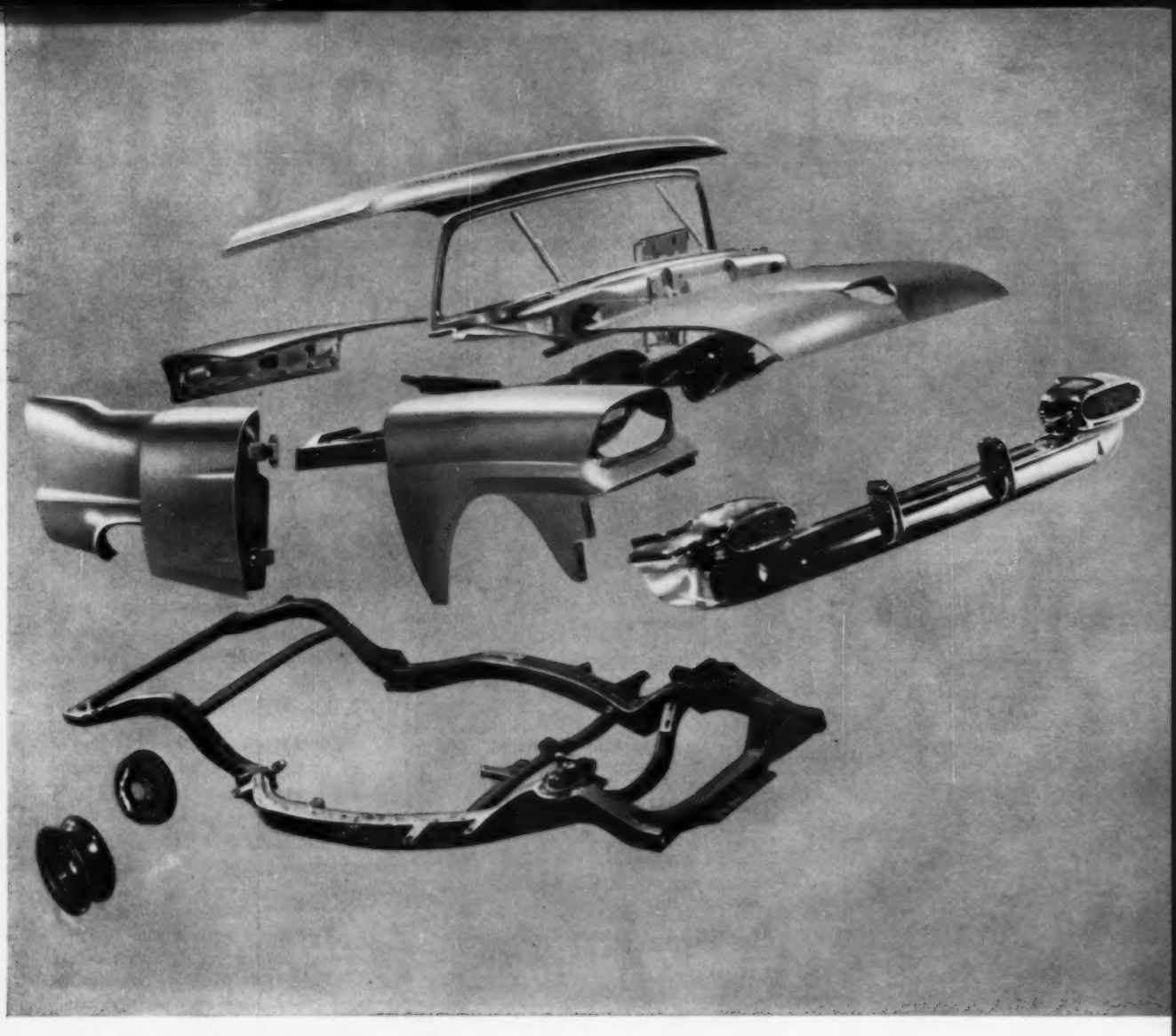
THERE IS NONE BETTER

MESTA Universal Structural Mill rolling wide flange beams on the 44" Universal Stand and the 34" Edging Stand at Inland Steel Company, Indiana Harbor Works

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



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IRON AGE

December 11, 1958—Vol. 182, No. 24

Digest of the Week in

*Starred items are digested at right.

EDITORIAL

Man, Machines and—Courtesy and Common Sense ... 7

NEWS OF INDUSTRY

*Special Report: Consumer Confidence Picks Up ... 89
Ultrasonic Welding ... 91
*SUB Gets Legal Setback in Ohio ... 92
*Miners Get More ... 93
*New Look in Economic Warfare ... 94
*Loan Plan Aids Small Business ... 96
*Waste Nitrogen Finds a Home ... 97
The IRON AGE Salutes ... 101
Men in Metalworking ... 116

FEATURE ARTICLE

*How to Get More for Your Nonferrous Castings Dollar ... 121

NEWS ANALYSIS

Newsfront ... 9
Report to Management ... 103
*Automotive ... 105
*Washington ... 109
*West Coast ... 111
*Machine Tool ... 113

MARKETS & PRICES

Market Planning Digest ... 87
*The IRON AGE Summary ... 89
*Purchasing ... 162
Steel Product Markets ... 164
Index to Prices ... 165
Iron and Steel Scrap Markets ... 166
Nonferrous Markets ... 170
Clearing House ... 180

REGULAR DEPARTMENTS

Letters ... 11
Fatigue Cracks ... 13
Coming Exhibits, Meetings ... 15
Industrial Briefs ... 114
New Materials, Components ... 138
You Arbitrate It ... 148
Free Literature ... 150
New Equipment ... 155

INDEX TO ADVERTISERS ... 185

NEWS ARTICLES

CONSUMER CONFIDENCE

Picking Up—There is a major upturn in buyer confidence. Historically, it precedes an upturn in durable goods sales. But sales may stay below 1955 levels. P. 89

SUB SETBACK IN OHIO

Court Rules Adversely—Workers cannot accept both supplementary unemployment funds and state aid at same time, says Ohio Supreme Court. Setback may be temporary as industry and unions plan action. P. 92

COAL MINERS

Lewis Gets More — Bituminous coal labor contracts provide for a raise of $1.80 a day on Jan. 1 and more later. It means the price of soft coal will be going up. P. 93

ECONOMIC WARFARE

History Repeats — Trying to weaken Free World trade by sharp maneuvers is an old Red trick. But they've streamlined their approach in the past 28 years. P. 94

SMALL BUSINESS LOANS

How New Plan Operates—Private investment firms are set up under new law, partly financed by Federal funds. They, in turn, will make loans to small businesses. P. 96

LABOR REFORM PROSPECTS

Little Chance in '59—Don't ex-

Metalworking

◀ **NONFERROUS CASTINGS:** It's a billion dollar industry. A. H. Hinton, sand foundry manager at Alcoa's Cleveland Works, checks dimensions of aluminum casting for torque converter. In background, Wm. Walters, foundry foreman, prepares color-coded combination sand and plaster cores. P. 121

pect any drastic reform moves from pro-labor Congress which meets in January. Action to curb abuses of secondary boycotts unlikely. P. 109

GAS TURBINE ENGINES

Future in Doubt—Major technical problems involved in gas turbine design have been solved. But auto producers appear reluctant to adopt this new principle. P. 105

FEATURE ARTICLE

HOW TO GET MORE FROM NONFERROUS CASTINGS

Choice in Aluminum—Cast aluminum has an impressive array of properties such as light weight, good corrosion resistance and high conductivity. Aluminum castings are easy to work, a factor in cutting machining costs. P. 122

Versatile Copper—Casting ease accounts for much of the widespread use of copper-base alloys. Tensile strengths run up to 155,000 psi with yield strengths on the order of 90,000 psi. P. 126

Magnesium for Lightness — It's the lightest of all structural metals and offers the highest strength-weight ratio. This is why most castings made to date have gone into aircraft. But other uses are growing fast. P. 129

Nickel-Base Castings—These are the standbys for high-temperature service, very corrosive conditions or a combination of the two. Littler-known properties of some types include wear resistance, bearing qualities and high strength. P. 132

NEW FEATURE

Design Digest—What's new in materials and components? Now, as a regular weekly feature, The IRON AGE brings you a new section. This week it starts on P. 138

Zinc Diecasting—Zinc-base diecastings are strong and they can be held to very close tolerances. Two types of zinc alloys are now in widest use, with aluminum the most important alloying element. Main difference is copper. P. 134

MARKETS & PRICES

NITROGEN BY-PRODUCT

Finds a Home—First large-scale use of waste nitrogen from oxygen making process is planned. It opens the door to a new market, improved steel, and cost savings. P. 97

FARWEST BOOM

A Blueprint — By 1970, West Coast manufacturers may have doubled their present labor force of 1.2 million. Gains are forecast for metals, machinery, fabricating and aircraft. P. 111

TAPPING PROBLEMS

They're Avoidable — Taps are probably the least understood of the common cutting tools. Even though they are ground to standard thread forms, each brand is different. P. 113

STEEL INVENTORIES

Cutbacks Were Severe—Steel men say their customers' inventory cuts during the recession were the greatest in history. Buildup, plus industrial recovery, could lead to some tight spots. P. 161

ELECTRICAL CONTROLS

Makers in Cost Squeeze—With the market competitive, builders of control systems would like to hold the price line. But cost pressures will probably mean a slight price rise in 1959. P. 162

NEXT WEEK

INDIRECT LABOR

Controlling Costs—Keeping the costs of indirect labor under control isn't as difficult as many believe it to be. Next week, Harold B. Maynard, a leading management consultant, tells how it can be done with great cost cutting potential.

new

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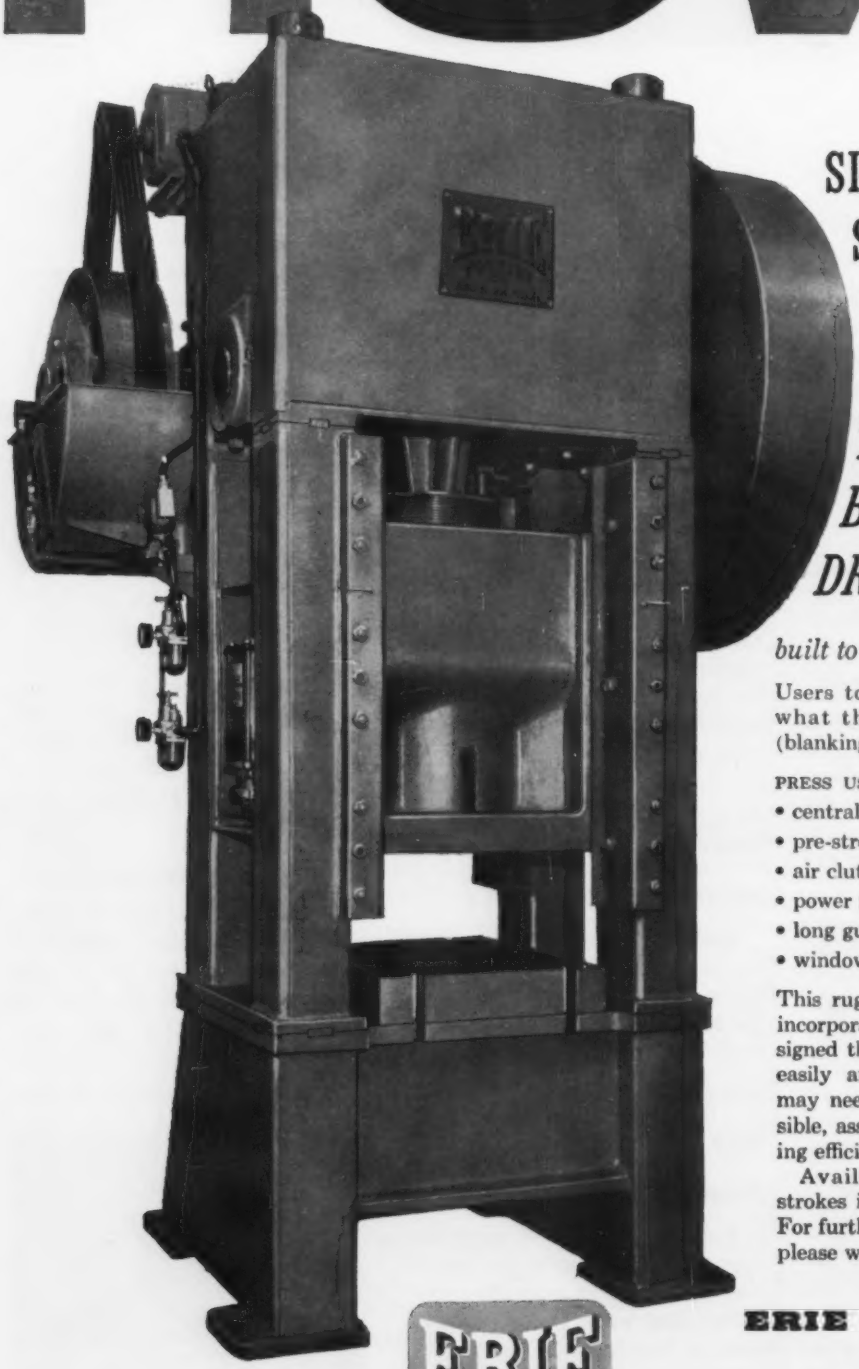

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PRESS USERS ASKED FOR:

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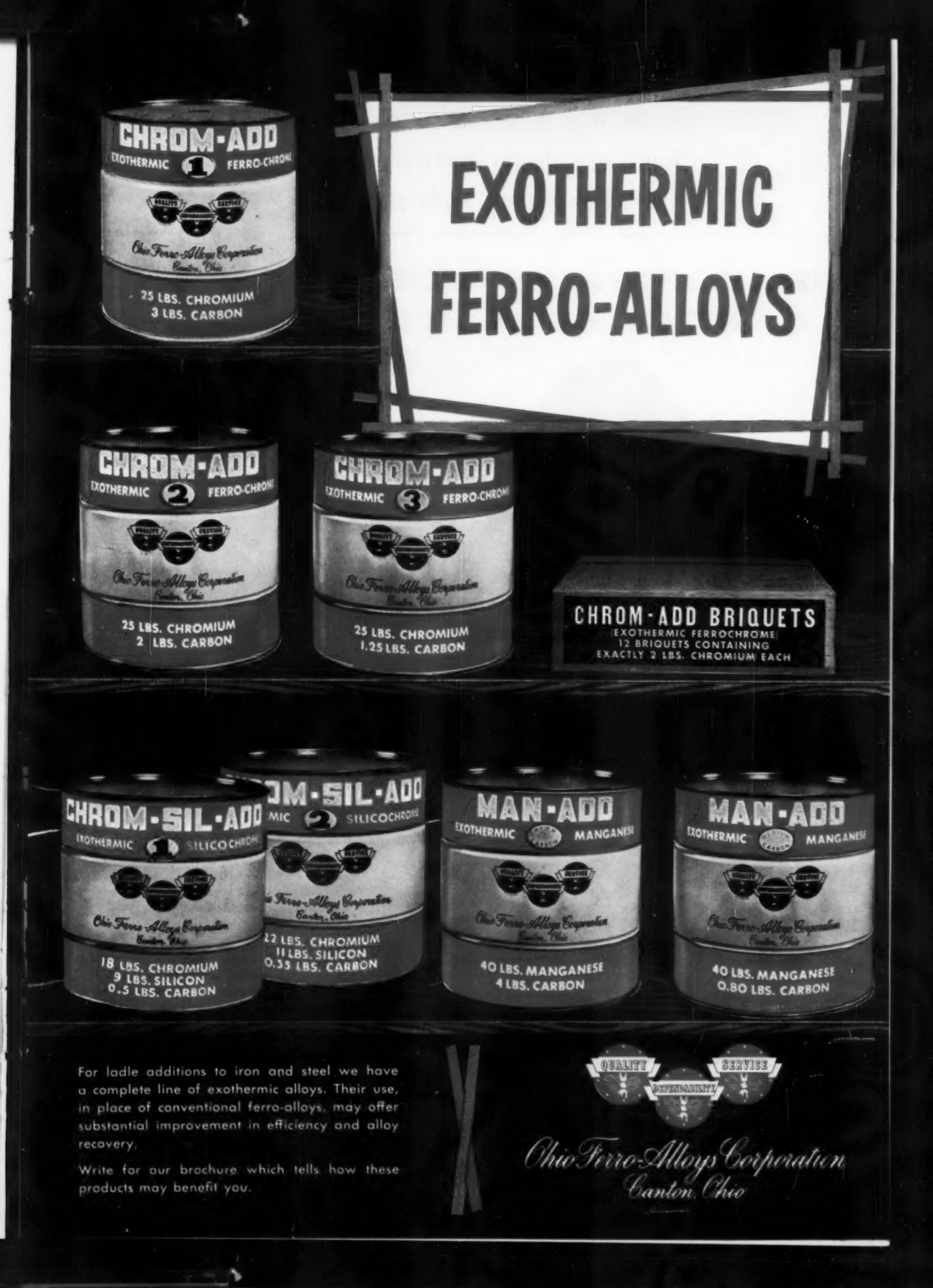
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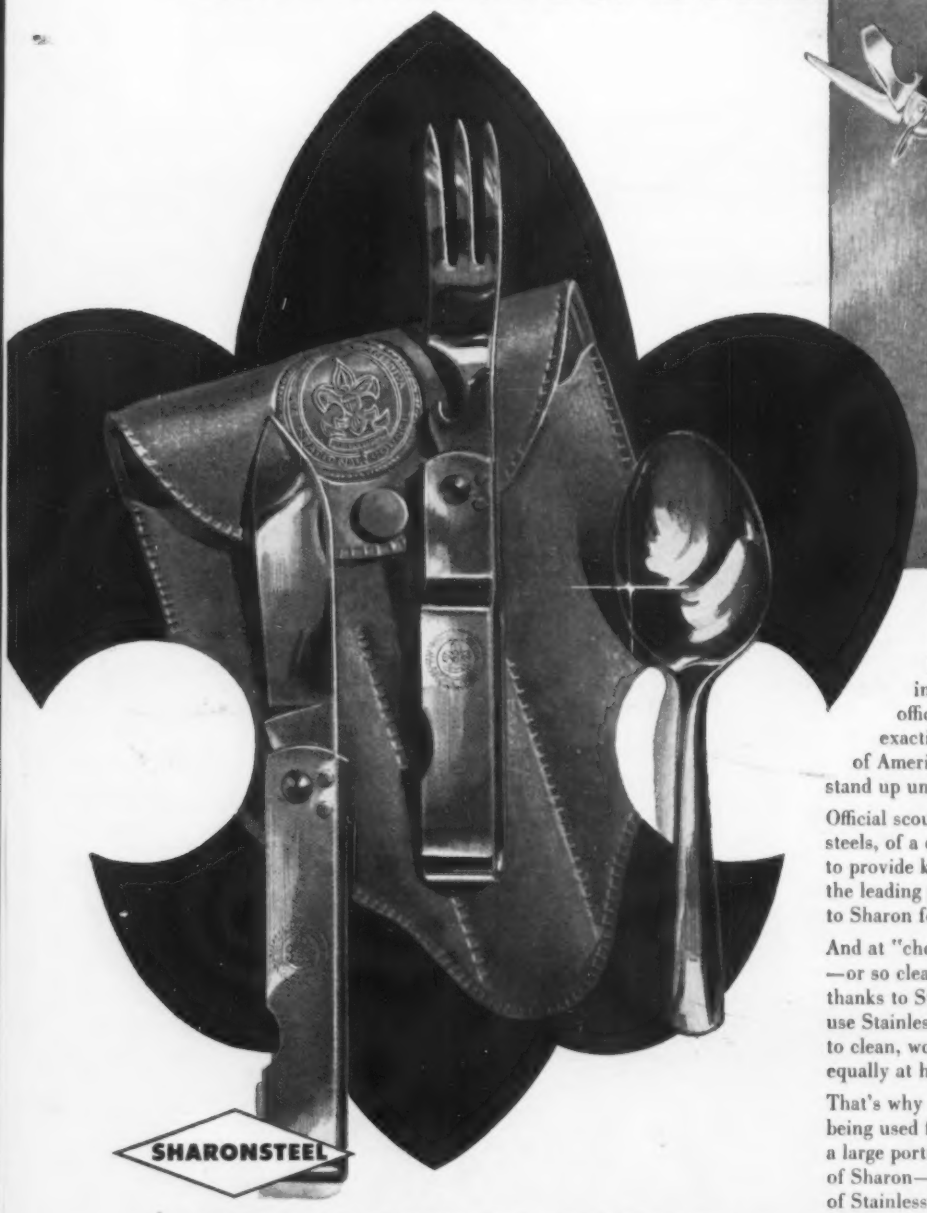

Nearly five million scouts and their leaders enjoy the fun, adventure and inspiration of scouting. Their official equipment, all made to the exacting specifications of the Boy Scouts of America is of the finest—it has to be to stand up under rough, tough service.

Official scout knives are made of fine carbon steels, of a quality and uniformity warranted to provide keen, long lasting edges. That's why the leading producer of official knives looks to Sharon for its steel supplies.

And at "chow time", scouts never had it so good —or so clean! In every climate, the year round, thanks to Stainless Steel, millions of scouts use Stainless Steel eating gear because it is easy to clean, won't rust or white corrode, and it's equally at home indoors or out.

That's why more and more Stainless Steel is being used for scouting and camping equipment— a large portion of which comes from the mills of Sharon—one of the nation's leading producers of Stainless Steels.

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Man, Machines And— Courtesy and Common Sense

Maybe we're an old stick-in-the-mud or a fuddy-duddy. But it looks as if the machine is taking over in some areas where humans belong. Not in the big things where millions are saved, but in the small things where thousands of dollars are saved and millions of humans temporarily become frustrated.

Our rate of lid flipping is related to small frustrations partly brought on by the machine. This expansion of lid flipping may endanger future customer relations to the point where we will deal with icicles instead of people.

The examples are legion, but let's take a few. A man receives a check. Now he isn't going to eat it, chew it or tear it up. But the notation says, "don't mutilate, staple or fold." When our hero sees this he explodes. He may retaliate by folding, mutilating or punching holes in the check.

Take another. You mailed your check a week ago. Slow mails and machine deadlines bring you a new bill. With it is an insert which says, "If you mailed a check disregard this. If not, pay now. Don't write to us." Is the machine doubting your sense of honesty? But you can't argue with a machine. And the v.p. who gets your letter of complaint won't know what you are talking about.

Or take the squawk box which says, "This is not a working number, please . . . " etc. Of course, this saves time, labor and brings down telephone costs but when a human being—warm or cold—is talked to by a machine something snaps.

Let's skip the question of broken promises in repair and maintenance of our modern conveniences. Pass over too the lack of communications between customer and seller—and between seller and customer. Courtesy used to be a two-way street. Now it's an empty blind alley.

Big things, big costs and new products are aided by the machine. But somewhere along the line common sense on many small things went out the window. That, in turn, made potential switch blade wielders out of nice ordinary folks. And you can't blame them because we all brought this on ourselves.

As we go into the space age and the "ditch it, don't fix it" era, maybe we ought to recall that there is no substitute for a human being who tries to use "live" courtesy and common sense.

Tom Campbell

Editor-in-Chief

CASE HISTORIES

N/D achieves maximum axial and radial rigidity by matching two or three super-precision angular contact bearings having different contact angles. See figures 1 & 2 below.
FIG. 1
FIG. 2

Photo: courtesy Ready Tool Company

Bearing Design Helps Live Center Maker Achieve Accuracy of .000050"!

CUSTOMER PROBLEM:

Live center maker requires bearing design that will help achieve . . . and maintain . . . live center accuracy of .000050", under combination radial and thrust loads.

SOLUTION:

After thorough evaluation of the problem, New Departure recommended N/D pre-loaded, duplex ball bearings. Extensive testing proved these super-precise ball bearings resisted combination radial and thrust loads with minimum deflection. The N/D ball bearings, with medium and high contact angles, are mounted duplex and positively clamped together to assure the optimum, pre-determined preload condition. As work expansion increases the thrust load, radial centering becomes more rigid and accuracy is precisely maintained . . . to less than .000050" total indicator run-out!

When you're working on new designs that call for high precision ball bearings, why not call on New Departure? New Departure's consistent precision is your assurance of the ultimate in accuracy for your design. For more information, call the New Departure Sales Engineer in your area or write Dept. S-12.

Available through United Motors System and its independent Bearing Distributors.

NEW DEPARTURE

DIVISION OF GENERAL MOTORS, BRISTOL, CONN.

NOTHING ROLLS LIKE A BALL

Building Block Progress

Although informal meetings of users and machine builders show little basis for agreement yet, individual machine builders are advancing the building-block principle with each new transfer machine designed. Latest evidence is a unit to do 115 machining operations on a power steering pump housing. Standardization results in some dimensions being held within 0.0001 in. Provisions are included for major part changes.

Produces Compact Cermets

By using a non-combustible helium-hydrogen atmosphere, compact, non-porous cermet specimens have fired properties reported to be equal to or better than the metal alone. The reason for selecting this atmosphere: the belief that pure hydrogen produces too much reduction of the reducible portion of the oxide phase and that helium or vacuum produces too little.

Molybdenum for Oils

Molybdenum producers are excited over research results showing significant advantages to molybdenum bearing oils and greases in automotive lubrication. They expect this application to provide a substantial market for their product.

Labor Relations Control

More federal regulation of labor-management hassles is in the works. The new Congress is to insist that Washington act as referee in a long list of instances not now subject to federal control. Up to now, National Labor Relations Board avoided meddling in some industries, such as the hotel trade, claiming only local interest was involved. But pressure from unions for federal control is making an impression on the Congress.

Pilot Plant Solves Problem

Operation of a new chemical process demonstrates solution to one of metallurgy's problems —use of waste pickle liquor. The entire sulfate equivalent is recovered as reuseable sulfuric acid without the use of a contact sulfuric acid plant. The one by-product, iron oxide, is of high quality. When sintered, it can be recharged to the blast furnace. A commercial plant could treat 100,000 gal of pickle liquor a day, containing 8.5 pct sulfuric acid and 13 pct ferrous sulfate.

Aluminum Wire for Motors

Look forward to use of aluminum windings in fractional horse power motors. It's known that several firms are making such motors on an experimental basis. Effort is being directed at solving some of the fabricating problems.

Check Earth's Magnetism

An extremely accurate device for determining the strength and characteristics of the earth's magnetic field is said to be superior to other such instruments. It's a new type of magnetometer utilizing helium in a special gaseous state, called metastable helium. The rugged, yet sensitive unit was developed for use with exploring rockets, but could also be useful in searching for oil and minerals.

Nondestructive Testing

A new high-speed instrument tests and sorts accidentally mixed or incorrectly processed metal parts. For either ferrous or nonferrous metals, the unit sorts raw stock, semi-finished or finished parts by their metallurgical characteristics, such as analysis, hardness, structure and case depth. With a known and acceptable part used as a standard in adjusting the instrument, unwanted parts are quickly separated from the good ones.

Study Ozone Combustion

Pre-mixes of ozone and combustible gases burn without detonation. Static experiments in a research program showed that all fuel gases such as hydrogen, cyanogen, methane, can be mixed with pure ozone, with the exception of carbon monoxide and ethylene. Ozone flames burn faster than comparable oxygen flames, particularly when they contain hydrogen.

Here's how to

KEEP COSTS DOWN on

Welding Operations

The NEW Low Cost "Budget 500" AC transformer arc welder

Here's HOBART'S answer–

You can solve the high cost production problem and realize greater profit with the new "Budget 500." It will cut costs for you, 3 ways: 1. It's priced low. 2. It will keep maintenance costs to an absolute minimum (rugged, long-lasting construction includes the qualities that have made Hobart the standard of comparison). 3. It s performance will add to every operator's efficiency, helping him turn out better work with less effort.

How Well does it Perform? Special steel cores and a "shell type" design keep efficiency extremely high. No load losses are kept to a minimum. The "Budget 500" is rated at 500 amperes, 40 volts. Welding current range: 100 to 625 amperes. A high open circuit voltage provides easy arc striking and a continuing smooth, stable arc.

What about Control? Hobart's "Diverter Path" magnetic field-rheostat method of control enables the operator to adjust welding current safely and accurately throughout the machine's long life. It is extremely quiet. Cores and coils are firmly anchored—they cannot become noisy or cause difficulty in controlling current.

Does it have Cool Operation? Definitely! A powerful, shrouded down-draft fan draws clean, fresh air from the cabinet's top sides—not from the bottom where dust, lint and dirt are likely to collect. *All* internal parts are bathed with cool air.

Why was the "Budget 500" Made? Because Hobart is constantly alerted to welding industry problems. Keeping overhead costs down is one of them. You're bound to benefit by checking into the advantages of this welder. Send for complete details now while the thought is still fresh in your mind.

A COMPLETE LINE OF TRANSFORMER TYPE ARC WELDERS FOR EVERY REQUIREMENT

THE "HUSTLER," 180 amp. small shop welder. Easy to operate. It cuts, burns holes, hardsurfaces, solders, brazes, heats metal for bending and forming. Comes complete with accessories—ready to weld.

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Likes New Survey

Sir — The Quarterly Survey on Metalworking Capital Appropriations is certainly an article I will be looking forward to studying each quarter as it appears.

I would appreciate receiving a reprint of the first article in the series which appeared in the November 27 issue. Thank you for your cooperation in this matter. —J. E. Tague, Mgr., Industrial Sales Section, Bausch & Lomb Optical Co., Rochester, N. Y.

Planning

Sir—Would you kindly send me a reprint of the article, "How to Plan for Business Change," by Walther H. Feldmann, President, Worthington Corp. which appears in your Nov. 13, 1958 issue. Chicago Title & Trust is a subscriber of yours; we think you are doing a bang-up job! — E. P. Crossen, Investment Officer, Chicago Title and Trust Co., Chicago.

Sir—This is an interesting article and we would like to have reprints for future reference for two of our divisions. J. McMillan, Vice Pres. and Plant Mgr., The Canadian Blower & Forge Co., Ltd., Kitchener, Ontario, Canada.

"I'm the new efficiency expert, why?"

Sir—In my opinion this is one of the best articles on this subject it has been my privilege to read.—F. I. Biggs, Engineering Mgr., Elliott Co., Ridgway, Pa.

Workmanship

Sir—We like the editorial by Tom Campbell, Editor-in-Chief, which appeared in the November 6 issue (Pride of Workmanship—What Has Happened To It?).

We wondered if we might have permission to reprint it, with credit to you, of course, in one of our two company publications. — M. L. McNulty, Publicity & Advertising, C. H. Wheeler Mfg. Co., Philadelphia.

Sir—May we have permission to use excerpts of this editorial with proper credit to the author and to the magazine.

We would like to use these excerpts in our booklet, Operating Briefs, which is distributed to foremen throughout the United States and Canada through our Information Rack Center.—V. Plesscher, Editorial Director, The National Research Bureau, Inc., Chicago.

■ Permission granted in both cases.—Ed.

Do's and Don'ts

Sir—The editorial in the Oct. 23 issue (Some Do's and Don'ts In Business and Politics) is most interesting reading and deserves wide distribution.—W. P. MacCracken, Jr., MacCracken, Collins & Whitney, Washington, D. C.

PHILLIPS OR SLOTTED
TAPPING SCREWS
BY Southern

in STEEL, ALUMINUM, OR STAINLESS
FLAT, ROUND, OVAL, PAN, TRUSS, HEX
Types: A, B, C & F

Southern makes the tapping screws you need for faster, more profitable production... Rigid quality-controlled manufacturing methods in our own plant, employing only U.S.A. workers and materials, means that you can safely place full confidence in Southern as your one source for fasteners.

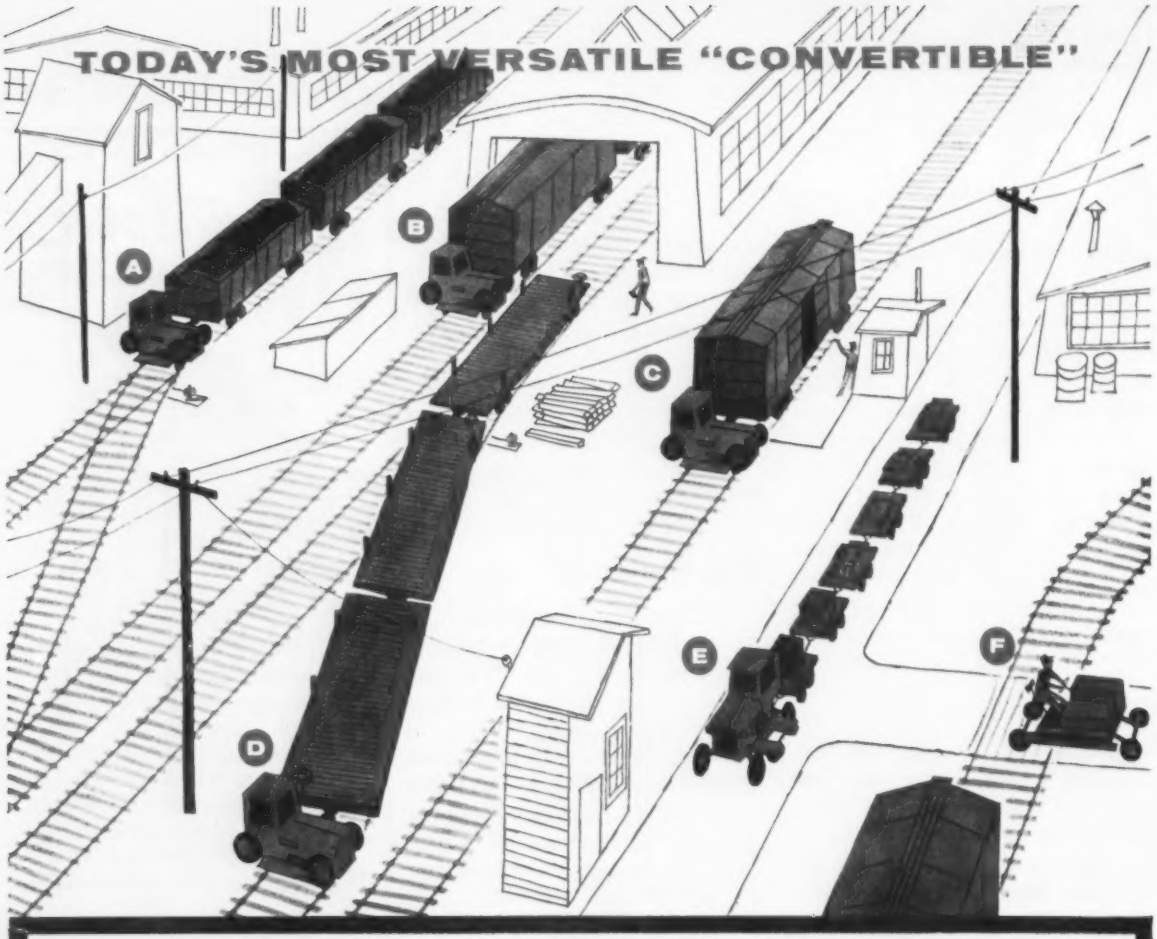
Over one billion Southern screws in stock. Four Southern warehouses mean service with a capital S!

Wire or phone your requirements, or write Southern Screw Co., P. O. Box 1360, Statesville, N.C.

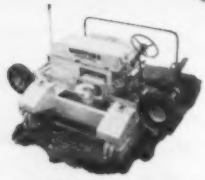
A. B. C & F TAPPING SCREWS
DOWEL SCREWS • MACHINE SCREWS & NUTS • CARRIAGE BOLTS • STOVE BOLTS • WOOD SCREWS • SPEAKER SCREWS
HANGER BOLTS • WOOD KNOB SCREWS • DRIVE SCREWS

Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA

TODAY'S MOST VERSATILE "CONVERTIBLE"



3 Models to Meet Your Specific Needs



2TM Trackmobile

3TM Trackmobile

5TM Trackmobile

All three models of the Whiting Trackmobile switch, spot and haul freight cars fast and at low cost. Trackmobile converts from road to rail in seconds to facilitate car handling, makes your operation more profitable. Here are just a few of the many ways you might use "Today's Most Versatile Convertible":

- **A** New 5TM torque converter Trackmobile quickly switches fully-loaded coal cars.
- **B** Railroads are big Trackmobile boosters—use them to shuttle cars in and out of repair shop.
- **C** 3TM Trackmobile is on the job rain or shine. Here it spots a freight car with pin-point precision.
- **D** 3TM Trackmobile returns empties or loaded cars to siding, positions cars where they're needed, frees plant from dependence on switch engines.
- **E** No freight cars to move at the moment, so 5TM converts to road wheels to haul carts.
- **F** Trackmobile can travel "cross-country" on rubber tires to where it's needed. Now this 2TM will convert to steel rail wheels in seconds.

SEND FOR TRACKMOBILE FACT FILE—Illustrated folders on all three Trackmobile models. See which one meets your needs best. Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

WHITING

TRACKMOBILE

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD, AND CHEMICAL PROCESSING EQUIPMENT

Nonferrous Castings

Whether or not your company uses non-ferrous castings you'll benefit from reading our latest article on "How to Get More for Your Metalworking Dollar," in this issue.

That's because this 16-page feature is aimed at two groups—present castings users and potential buyers. The contents will help present buyers get good castings at lower cost. And they should also help show those now fabricating by other means what castings can do.

Nonferrous castings are big business. Each year users spent more than a billion dollars for about a million tons of product. And the field is a rapidly changing one where new developments are constantly arriving.

So for an up-to-date, comprehensive rundown on current practice in aluminum, copper, magnesium, and nickel-base casting we recommend the article beginning on p. 121.

Annual Clearance

This is the time of year when merchants are clearing away the old stock and making way for the new. We didn't know this also applied to words and press releases until the other day.

Then we received a provocative little booklet from the industrial publicity firm of Harry W. Smith, Inc. Seems they are chucking out their remaining stocks of 1958 releases at bargain rates to make way for 1959 models.

Offered for inspection are editorial "nuggets" where every effort is made to keep the reader in suspense. What, for example, is being lauded in this story:

"New miracle cellulosic fiber . . . can be sawed, drilled, and worked like plastic . . . is buoyant in aqueous media . . . can be painted with relative ease.

"When ignited . . . disintegrates into glowing fragments conducive to food preparation and group song. Fibers when degraded and dried can be utilized for applications in reading, writing, and wrapping."

The answer: Wood.

Light on the Office

How soon will we have the nearly-perfect office? According to W. S. Fisher, Office Lighting Specialist, General Electric Co., it's already technically possible. "The problem of bringing present office environments closer to the optimum becomes a matter of economics," says Mr. Fisher.

People are the biggest factor in office expense, he points out. They represent nearly 85 pct of the total cost of office ownership and operation. In contrast, office lighting—which influences the quality of desk work—represents about 2 pct of the cost of doing business. Adequate lighting, Mr. Fisher notes, costs as much to management each day as a 10-minute coffee break.

"Do I tell you how to run your business?"

THE BIGGEST, NEWEST IDEA IN WORK GLOVES!

NORTH PVC GLOVES

...job-proved for extra safety, extra wear

Check these advantages . . .

- **Extremely tough**—Last two to five times longer than ordinary work gloves
- **Very flexible**—Give greater dexterity than any other coated gloves
- **Highly resistant**—Nonflammable, non-oxidizing and resistant to practically all chemicals—will not crack or peel

Give your employees the maximum protection afforded by North PVC Gloves. There's a size to fit every hand comfortably, reducing fatigue and increasing efficiency. As a result, your production will go up, your accident rate will go down. Available in knit-wrist, band top and gauntlet types—palm and partial back coated styles.

FREE OFFER—On your business letterhead, kindly furnish us complete details of your working conditions—and we will send you a sample pair.

1600 SERIES. Fully coated, heavy duty.

1800 SERIES. North-Grip—Permruff surface; for handling slippery surfaces.

We also make a complete line of North PVC chemical and foul weather protective garments and the famous Jomac loop-pile industrial gloves, handguards and safety sleeves for up-to-shoulder protection.

JOMAC Inc.

Dept. K, Philadelphia 38, Pa.

Associated companies and distributors throughout the world

How Bright Wire Fabricators Save and Make Money with DSC-Portsmouth Long Production Run

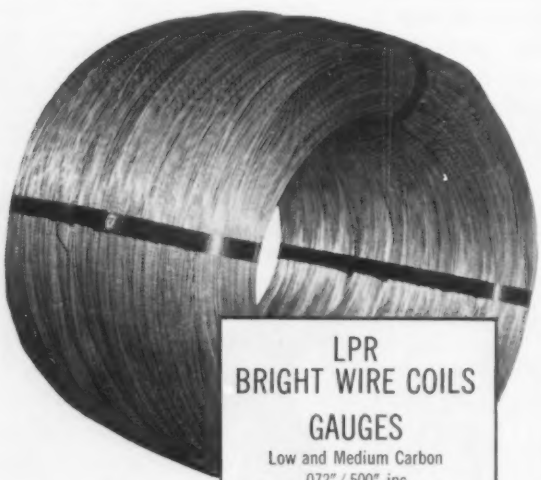
LPR COILS

One user summed up LPR advantages this way, "One big run on your LPR coils and we suddenly discovered after all our wire-working years, we had been using teacups instead of buckets for baling out our leaky production boat!"

WHAT OTHER TYPICAL USERS REPORT—

"We cut our unloading time in half."
"We reduced our coil storage space 15%."
"We quit using small-coil storage racks."
"Our man-hour costs dropped 20%."
"No more returnable gimmicks for us."
"We cut our scrap losses by 90%."
"In our cutting, straightening and flattening department, one operator now runs four machines. Best previously, three machines."

See how compactly you can stack over 13 tons of LPR coils



LPR
BRIGHT WIRE COILS

GAUGES

Low and Medium Carbon
.072"/.500" inc.
High Carbon—.080"/.250" inc.

COIL WEIGHTS

Up to about 4000 lbs. except
L. & M. C. .0475" to .062"
made in 1000 lb. coils

PERFORMANCE-PROVED PRODUCTION MATERIAL PLUS A SELF-CONTAINED COST REDUCTION SYSTEM

That describes DSC Bright Wire in LPR coils. **How about exploring the possibilities in your own operations?** Just call your nearest DSC "Rep" or write us at Detroit. Either way, your inquiry will get immediate action . . . whether your interest is Bright Wire or other DSC products and services. Hear from you . . . soon?

Happy Holidays and a Big New Year for All

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio, Dayton, Ohio, Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Houston, Texas, Indianapolis, Jackson, Mich., Louisville, Ky., Milwaukee, Wis., New York City, Rochester, N. Y., St. Louis, Toledo, Worcester, Mass.

The PROOF of DSC STEEL is in its PERFORMANCE on Your Job

DSC PRODUCTS: Coke . . . Coal Chemicals . . . Pig Iron . . . Basic Open Hearth Steel Ingots, Blooms, Slabs, Billets, Rods . . . HR and CR Sheet and Strip . . . Flat CR Spring Steel . . . Manufacturers' and H.C. Specialty Wire . . . Welded Wire Fabric

© DSC 1958

COMING EXHIBITS

Ornamental Iron Trade Show—Jan. 8-10, Atlanta Biltmore Hotel, Atlanta, Ga. (National Ornamental Iron Mfrs. Assn., 1977 College Ave., N. E., Atlanta, Ga.)

Plant Maintenance & Engineering Show—Jan. 26-29, Public Auditorium, Cleveland. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

International Heating and Air Conditioning Show—Jan. 26-29, Convention Hall, Philadelphia. (International Exposition Co., 480 Lexington Ave., New York 17.)

Western Metal Show — March 16-20, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

Corrosion Show — March 16-20, Chicago. (National Assn. of Corrosion Engineers, 1061 M & M Bldg., Houston 2, Texas.)

Industrial Finishing Show—June 15-19, Detroit Artillery Armory, Detroit. (Information: H. J. McAleer, 3171 Bellevue, Detroit 7, Mich.)

MEETINGS

JANUARY

Aluminum Window Mfrs. Assn.—Winter meeting, Jan. 7-8, Key Biscayne Hotel, Miami, Fla. Society headquarters, 75 West St., New York 6.

Institute of Scrap Iron & Steel, Inc.—Annual convention, Jan. 11-14, The Waldorf Astoria, New York. Institute headquarters, 1729 "H" St., N. W., Washington, D. C.

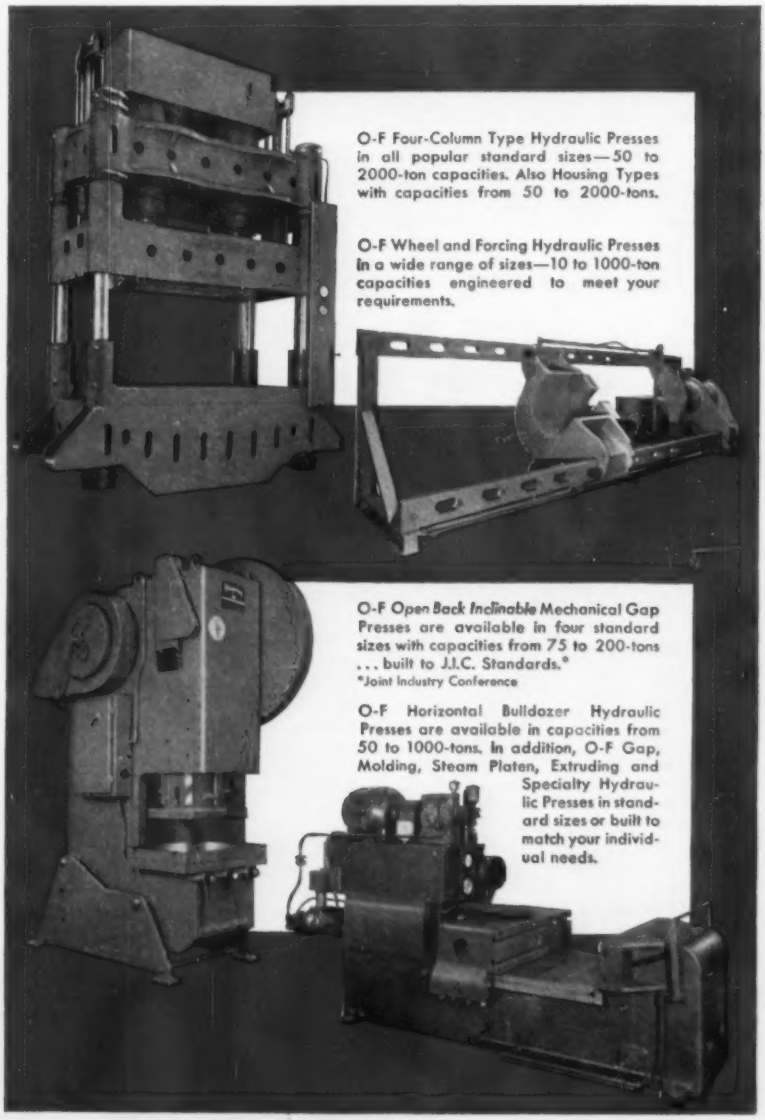
Society of Automotive Engineers—Annual meeting and engineering display, Jan. 12-16, Sheraton-Cadillac and Hotel Statler, Detroit. So-

(Continued on P. 16)

Hydraulic and Mechanical

OLIVER *Farquhar* PRESSES

...designed and built with individual precision to give you maximum operating efficiency!



O-F Four-Column Type Hydraulic Presses in all popular standard sizes—50 to 2000-ton capacities. Also Housing Types with capacities from 50 to 2000-tons.

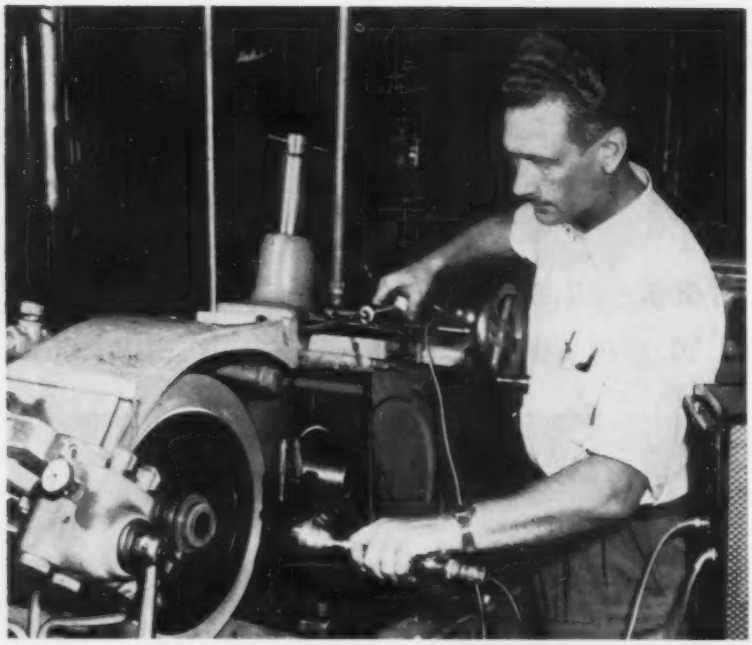
O-F Wheel and Forcing Hydraulic Presses in a wide range of sizes—10 to 1000-ton capacities engineered to meet your requirements.

O-F *Open Back Inclinable* Mechanical Gap Presses are available in four standard sizes with capacities from 75 to 200-tons . . . built to J.I.C. Standards.*
*Joint Industry Conference

O-F Horizontal Bulldozer Hydraulic Presses are available in capacities from 50 to 1000-tons. In addition, O-F Gap, Molding, Steam Platen, Extruding and Specialty Hydraulic Presses in standard sizes or built to match your individual needs.

Write, wire or phone today for the facts on Oliver-Farquhar Presses made with individual precision to give you maximum operating efficiency. Our engineers will be glad to submit recommendations covering our complete line of presses.

A. B. FARQUHAR DIVISION
The Oliver Corporation
Press and Special Machinery Departments
York 210, Pennsylvania
Also Manufacturers of Farquhar Conveyors



IRD VIBRATION ANALYSIS SYSTEM spots even .000001" displacement vibrations fast. Balances diamond grinding wheels like this in 1/12 the time formerly needed. Saved enough time on this job alone to pay for itself in 6 months.

TAKES 10 MINUTES TO BALANCE DIAMOND WHEEL FOR MIRROR FINISH PRODUCTION

GUARANTEE:

IRD system handles your tough balancing jobs just as fast

THE PROBLEM. Size Control Company, Chicago, Illinois finishes parts for their precision gages to almost microscopic tolerances. This means diamond wheels must be dressed frequently to eliminate vibration. Statically balancing a grinding wheel after it was dressed cost Size Control 2 to 4 hours downtime. This cut into production schedules, sent costs skyhigh.

HOW IT WAS LICKED. Now these same grinding wheels are dynamically balanced on the grinding machine *in 10 minutes*. One man does the job with a portable IRD Vibration Analyzer. This literally saves hours. Here are additional savings. Balance is so accurate, wheels need to be dressed just half as often for equal production. They last longer, cutting diamond cost 50%. And gage parts get a better finish than ever before possible.

WHY THE IRD SYSTEM GUARANTEES THESE RESULTS. Curiously, vibration is not the useless, random thing commonly believed. On the contrary, it is the easiest-to-use, yet most accurate guidepost to perfect balance. IRD Model 600 Vibration Analyzer employs this previously little used fact . . . simplifies dynamic balancing by making it a *visual* operation. Thus, even semi-skilled maintenance personnel achieve perfect results because they actually *see* the degree and direction of imbalance. Now you, too, can make dynamic balancing part of your routine maintenance program.

OTHER USES. IRD vibration analysis equipment makes it just as easy to accurately locate the exact source of vibration troubles. It eliminates hit and miss trouble shooting. It will pay you to read how others in your industry use IRD analyzers to step up production equipment output, make impressive savings in downtime. Write for literature.

IRD *system*

INTERNATIONAL RESEARCH & DEVELOPMENT CORP.
6155 Huntley Rd. Worthington, Ohio

EXHIBITS, MEETINGS

(Continued from P. 15)

ciety headquarters, 485 Lexington Ave., New York 17.

Industrial Heating Equipment Assn., Inc.—Annual winter meeting, Jan. 19-20, Cleveland. Society headquarters, 1145 19th St., N. W., Washington 6, D. C.

Steel Kitchen Cabinet Mfrs. Assn.—Winter meeting, Jan. 20, Blackstone Hotel, Chicago. Association headquarters, 1008 Engineers Bldg., Cleveland.

Steel Shipping Container Institute, Inc.—Winter meeting, Jan. 20-21, St. Regis Hotel, New York. Society headquarters, 600 Fifth Ave., New York 20.

The American Boiler Mfrs. Assn.—Mid-winter meeting, Jan. 22, Statler Hotel, Cleveland. Society headquarters, 4062 Mayfield Rd., Cleveland 21.

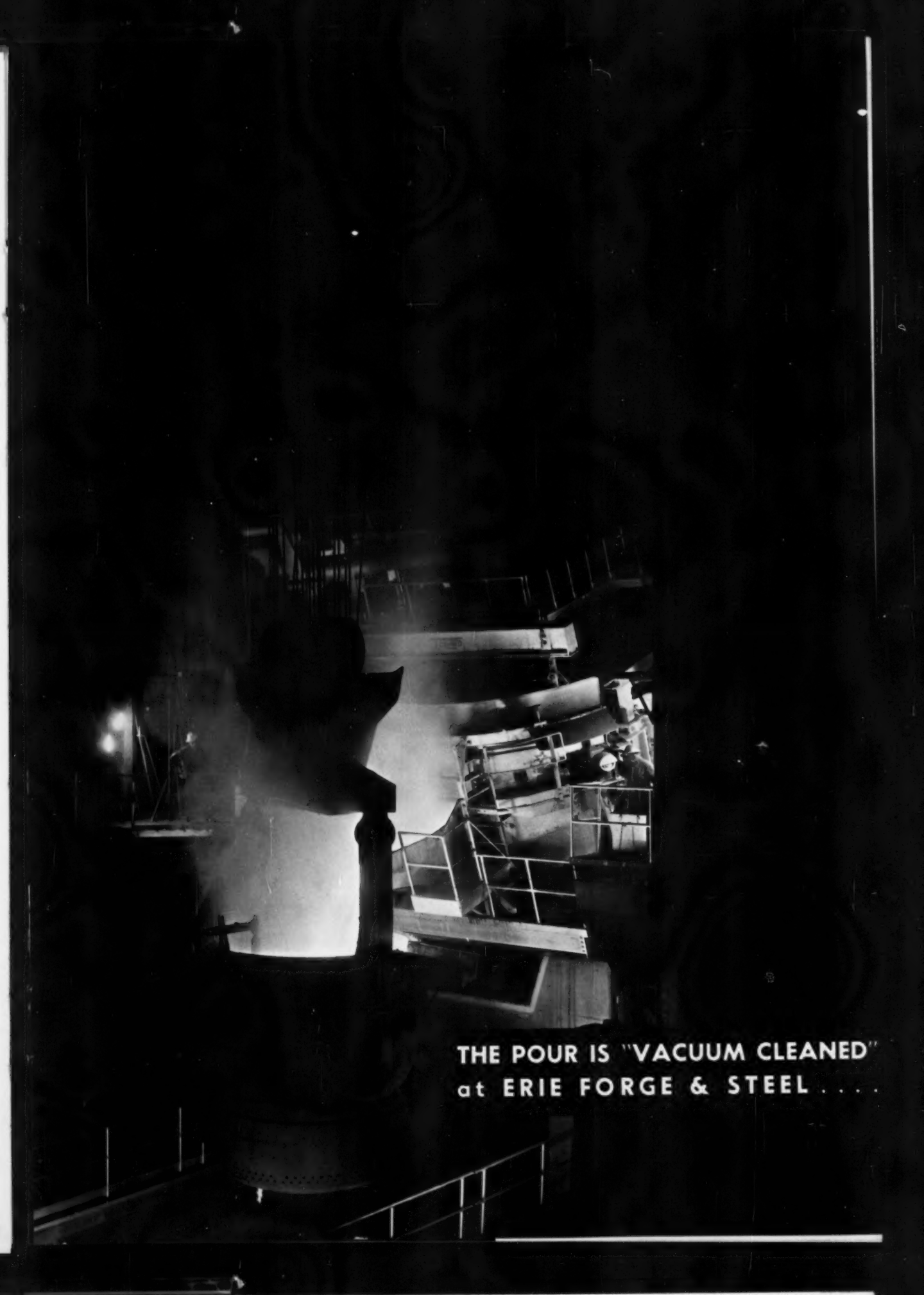
Hoist Manufacturers Assn — Annual meeting, Jan. 22, Palm Beach Biltmore, Palm Beach, Fla. Association headquarters, One Thomas Circle, Washington 5, D. C.

Institute of Surplus Dealers—9th annual trade show, Jan. 25-28, New York Trade Show Bldg., New York. Institute headquarters, 700 Eighth Ave., New York.

Truck Trailer Manufacturers Assn.—Annual convention, Jan. 26-28, Hollywood Beach Hotel, Hollywood, Fla. Association headquarters, 710 Albee Bldg., Washington 5, D. C.

Society of Plastic Engineers, Inc.—Annual technical conference, Jan. 27-30, Hotel Commodore, New York. Society headquarters, 65 Prospect St., Stamford, Conn.

Association of Roller & Silent Chain Manufacturers — Annual meeting, Jan. 28-29, Drake Hotel, Chicago. Association headquarters, 3343 Central Ave., Indianapolis.


THE POUR IS "VACUUM CLEANED"
at ERIE FORGE & STEEL . . . .

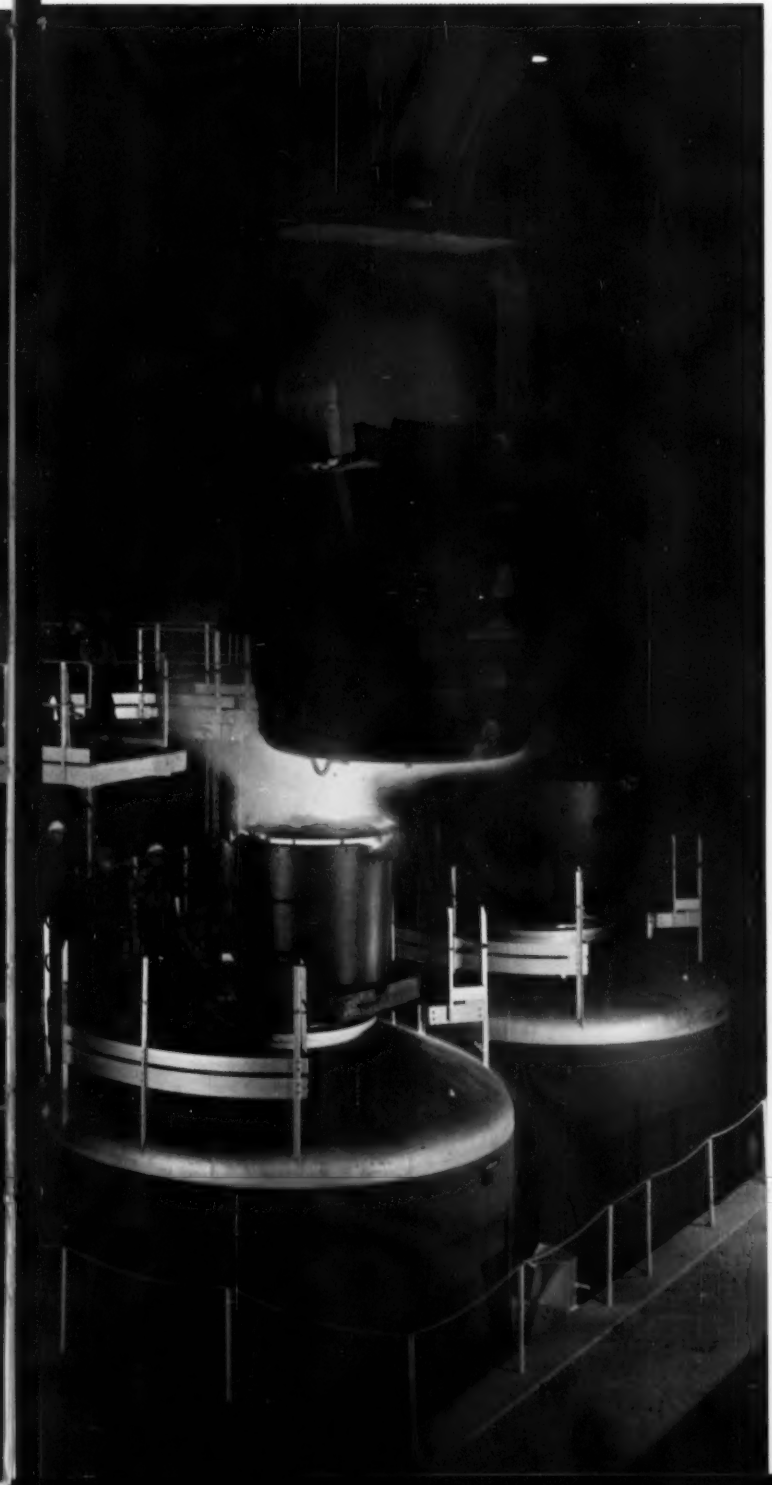
Charging Operation

Color Photography by Joseph Balbuza

75 TON ELECTRIC FURNACE

Pouring Operation

ELECTRIC FURNACE STEEL teams up with VACUUM CASTING at Erie Forge & Steel



Sired by The Electric Furnace Out of the Vacuum Chamber . . . Purebred Steel!

You are looking at the birth of a thoroughbred . . . *cleaner, tougher, more ductile steel* . . . product of purity of line . . . with rugged strength inbred.

Here is steel designed for the most demanding jobs in the diverse industries of the world . . . steel from raw materials carefully balanced metallurgically for the electric furnace charge.

Here is quality control in its finest form *before* the birth of the ingot. At the precisely predetermined second the melt leaves the electric furnace to be transferred to the vacuum chamber where the ingot is cast . . . an ingot which, when forged to specifications, heat treated and machined, may be the rotor at the heart of a high speed power turbine.

Cleaner, Tougher, More Ductile Steel for the special demands of industry is born here.

ERIE FORGE & STEEL CORPORATION
ERIE, PENNSYLVANIA

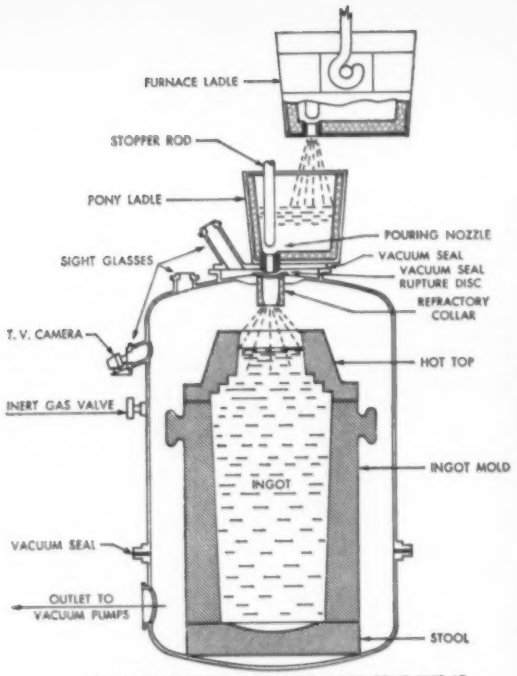
MEMBER AMERICAN IRON AND STEEL INSTITUTE

Higher Quality Steel is Born In The Vacuum Chamber . . .

Teaming the 75 ton electric furnace with vacuum casting produces the cleaner, tougher, more ductile steels which result from greater degrees of purity in the melt and in the pouring process. The jet of molten steel, discharging from the bottom of the pony ladle, melts a hole in the aluminum cover of the vacuum chamber, streaming continuously into the vacuum chamber. The absence of air in the vacuum chamber eliminates harmful gases. The result is a very minimum of hydrogen, nitrogen, oxygen and numerous volatile metals usually present. Two Television Cameras watch the operation inside the tank. One control panel, completely equipped with instruments and gauges, plus Television Screens, monitors the entire operation.

The high quality of Electric Furnace Vacuum Cast Steel meets today's demanding tests, such as ultrasonic procedures, to assure components of maximum dependability. This is but another step in the continuing program at Erie Forge & Steel to meet the needs of today's and tomorrow's industry for stronger, tougher, more ductile steels.

Complete details on Electric Furnace Vacuum Cast Steels are yours for the asking. Your problems in meeting your specific components demands will be welcomed by our technicians. Consult with us.



SCHEMATIC DIAGRAM OF VACUUM STEAM DEGASSING UNIT AT ERIE FORGE AND STEEL CORP.

Here's What We Produce:

STEEL FORGINGS FOR:

Crankshafts – Connecting rods for Diesel Locomotives – Presses – Compressors – Stationary Engines – Shafting for Naval and Maritime Vessels – Rotors for Naval and Maritime Vessels – Power Plants – Ordnance, Presses & Steam Hammers.

INGOTS

Basic and Acid Openhearth, Carbon, Alloy and Electric Steel for suppliers who do not have steelmaking facilities.

STEEL CASTINGS FOR:

Steam Hammers – Ship Castings – all types of large Presses – Rolling Mills – Hydro-Electric Engines – Steam Turbines – Crushers – Kiln Castings for Aluminum – Nickel – Tin – Magnesium and Cement Mills.

Your Nearest Erie Forge & Steel Sales Office is Listed Below

Pittsburgh 19, Pennsylvania
Sam B. Heppenstall, Jr.
475 Union Trust Building
J. R. Seiber
475 Union Trust Building
G. C. McGowan
475 Union Trust Building

New York 17, New York
William J. Vonah
60 East 42nd Street
Suite 2339

Lancaster, New York
Miller and Collins
35 Central Avenue

Milwaukee 5, Wisconsin
Dan P. Lorenz
2629 West North Avenue

Philadelphia District
Wiley B. Ford
7 E. Wynnewood Road
Wynnewood, Pennsylvania

Houston 3, Texas
E. E. Graham & Company
3701 Navigation Boulevard

Chicago, Illinois
Eugene F. Galvin
20 North Wacker Drive
Suite 1732

New Orleans, Louisiana
Morris J. Rabe, Jr., and Sons
1052 Annunciation Street

Detroit 4, Michigan
Fred T. Westmoreland
8730 West Chicago Boulevard
Suite "F"

Hudson 10, Ohio
A. G. Kessler
P. O. Box 472
190 Aurora Street

Clayton, Missouri
Claude L. Harrell
Room 307 Slavin Building

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

MEMBER AMERICAN IRON AND STEEL INSTITUTE

BIRDSBORO *tapered neck* ROLLS

help **broaden** *profits!*

B

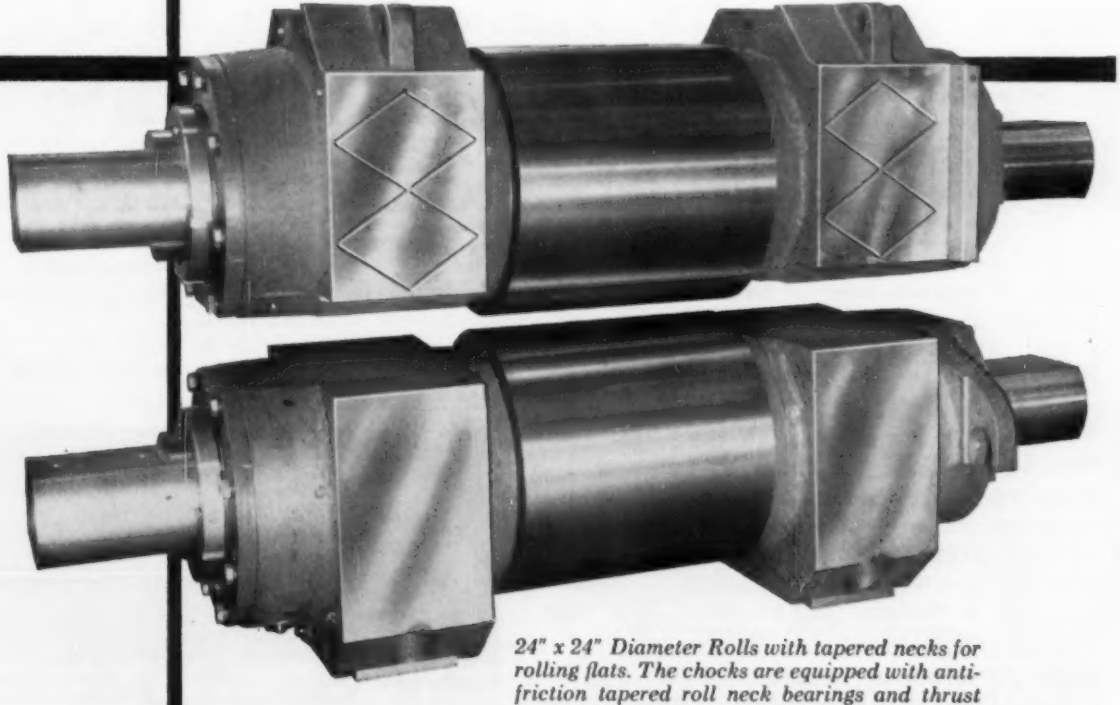
• It was a job that required the utmost precision . . . a job worthy of the talents of Birdsboro's roll engineering service group.

Birdsboro manufactured the rolls, the housing, and assembled the entire unit. Birdsboro engineers insured the client's investment in the rolls and assured the kind of economical service that will show up in profit figures. It takes precision in roll engineering to build the profit picture you need for today's production. Birdsboro will appreciate the opportunity to help you attain that precision. *Main Office, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

R.-26-58

BIRDSBORO
STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel



24" x 24" Diameter Rolls with tapered necks for rolling flats. The chocks are equipped with anti-friction tapered roll neck bearings and thrust bearings. Bottom chocks are equipped with four (4) hydraulic roll balance jacks.

KEEPS CUTTING FLUIDS
AS FRESH AS A DAISY

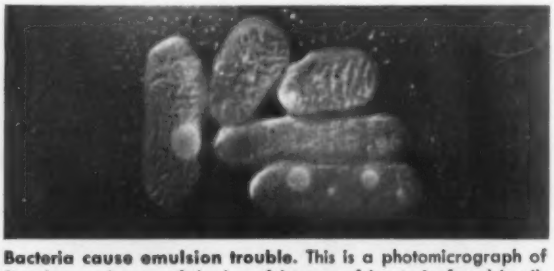
Here's why ELCIDE 75™ can increase the useful life of your soluble oil emulsions

Elcide 75 controls harmful bacteria that enter standard duty soluble oil emulsions and cause rancid odor, acidic corrosion, and emulsion breakdown. Prior to the development of Elcide 75, certain bacteria developed immunity to commonly used germicides, and no single inhibitor could control their damage.

Elcide 75 is a combination of proven anti-bacterial agents, and includes a powerful new compound related to one of the safest and most effective bacterial inhibitors used in the exacting field of medical surgery today. Just one ounce treats 4 gallons of emulsion.

Elcide 75 is not a "built-in additive" that is weakened by larger emulsion ratios. With Elcide 75 you know you have an effective, safe treatment because you add it to the emulsion right in your own plant.

Elcide 75 is completely safe for employees, machinery, and products. Not only is it non-toxic and harmless to sensitive skin, but its anti-bacterial action reduces the chance for infection caused by contaminated emulsions.



Bacteria cause emulsion trouble. This is a photomicrograph of *Pseudomonads*, one of the harmful types of bacteria found in oil-water emulsions. They enter the emulsion through the air, water, and plant debris, and make it possible for sulfate-reducing bacteria to cause odor, corrosion, and emulsion breakdown. Elcide 75 controls a much wider range of these and other types of damaging bacteria.

WHAT ELCIDE 75 MEANS TO THE METALWORKING INDUSTRY...

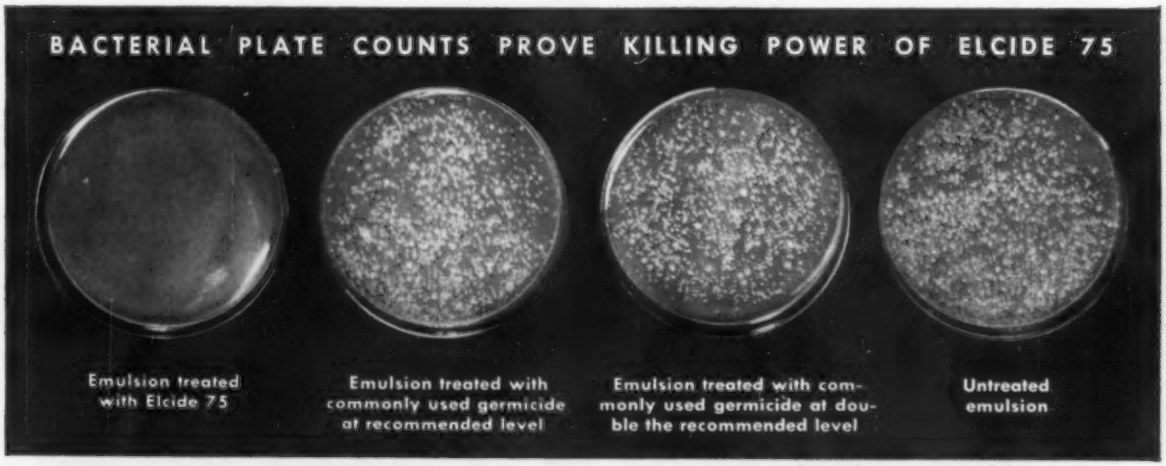
Operating costs can be greatly reduced because of Elcide 75. This saving is an accumulation of several important benefits.

Actual shop tests have shown that one ounce of Elcide 75 added to each four gallons of emulsion can keep the oil-water emulsion fresh as much as 5½ times longer. In one test, emulsions that normally had to be dumped at the end of four weeks ran for 22 weeks when treated with Elcide 75!

You can benefit by three direct savings—costly labor and down time for recharging will be reduced, your soluble oil requirements will drop, and the disposal cost of spoiled emulsions will diminish.

Elcide 75 also contributes to better products and longer machine tool life because it controls the bacteria which often cause acidic corrosion.

You can have a cleaner plant by using Elcide 75. It eliminates objectionable odors as well as bacteria that may cause skin infection. Elcide 75 is nontoxic and safe to use, as proved by tests conducted under normal shop conditions.


BACTERIAL PLATE COUNTS PROVE KILLING POWER OF ELCIDE 75
Emulsion treated with Elcide 75
Emulsion treated with commonly used germicide at recommended level
Emulsion treated with commonly used germicide at double the recommended level
Untreated emulsion

The photographs shown above illustrate the broad, powerful anti-bacterial action of Elcide 75. The light areas are bacterial colonies that have grown in three of the emulsion samples during 8 weeks' use. Note that none of these harmful bacteria appear in the emulsion treated with Elcide 75 during the same 8-week period. The emulsion stayed fresh.

PUT ELCIDE 75 TO WORK FOR YOU

The best way to determine the value of Elcide 75 to your own operation is to try it under normal plant conditions, using your standard duty emulsion. After you compare the costs of operation, you will agree that Elcide 75 is a valuable discovery that deserves a permanent place in your plant. Why not try Elcide 75 soon?

ELCIDE 75

Lilly

PATENT PENDING

PRODUCT SPECIFICATIONS
ELCIDE 75

(Lilly's brand of bacterial inhibitor for cutting fluids)

Active Ingredients—Sodium Ethylmercuri Thiosalicylate (Thimerosal) and Sodium *o*-phenylphenate.

Package	Price per Gal.
1-gallon polyethylene	$8.50
5-gallon polyethylene	$8.00
55-gallon stainless steel	$6.50

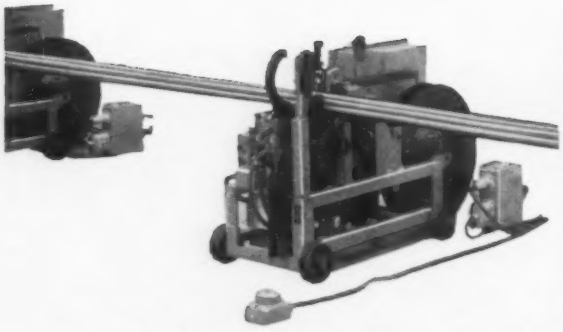
This product is sold only through selected distributors.

For further information or to place your order, write or phone:

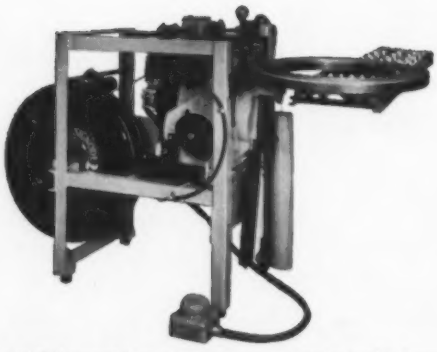
ELI LILLY AND COMPANY, AGRICULTURAL AND INDUSTRIAL PRODUCTS DIVISION, INDIANAPOLIS 6, INDIANA

TELEPHONE: MElrose 6-2211

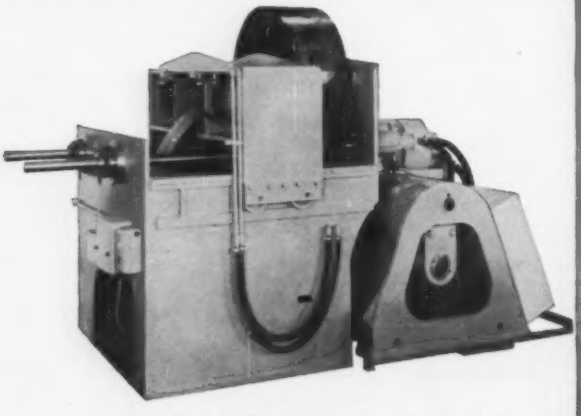
...proved in 73



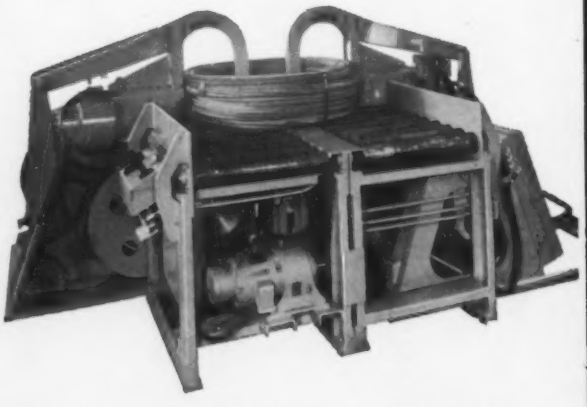
Signode MS2-B automatic strapping machines are used to bundle conduit, rods, tubing, and small dimension pipe. Usually two or three of these machines are used in line and operated from one control to apply two or three straps simultaneously. MS2-B automatic strapping machines can be adapted to handle and strap bundles of various shapes and sizes. Strapping operation is completed in four seconds.



The M2V machine straps narrow strip coils from ¼" to 2" wide. Each strap is applied in approximately 1½ seconds. Automatic and semi-automatic machines of the M2 series have been in steel mill operation since 1946, strapping conduit, rods, tubing, pipes, strip coils, mine roof bolts, and nail cartons.

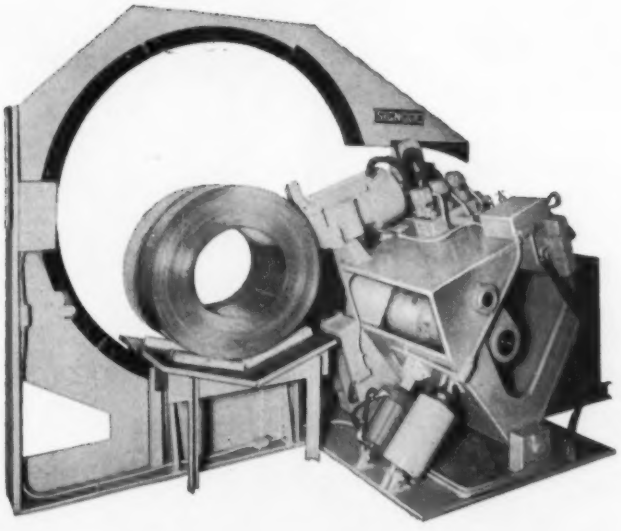


This MH10 series strip coil strapping machine will strap up to 120 coils per hour, three straps per coil. At the touch of a button, the machine tightens outer loops of the coil, squares up edges, positions the coil, and applies the strap to a pre-determined tension of up to 1200 pounds. Similar Signode machines have been in steel mill service since 1948...perform as well on hot coils—1200°F.



This dual automatic MH11 series strapping machine straps rod or wire coils up to 60" O.D. at 110 coils per hour. Machine applies single strap or applies two straps at once. Proper preset tension on every strap makes coils more compact, easier to handle, take less space. Signode wire coil strapping machines have been in steel mill service since 1949.

dependable steel mills



The Signode MH14-34 circumferential strapping machine is a relatively recent development. It automatically, and without adjustment for size, center-straps coils of from 30" to 60" O.D. Capacity is 300 to 400 coils per hour, depending on size. Coils can move through the machine in either direction.

SIGNODE machines reduce strapping and handling costs

The high cost of down-time in a steel mill puts a premium on machine dependability. Signode steel strapping machines have proved dependable—and productive—in 73 mills, some since 1946, in the hardest kind of service. Today's rising steel production gives additional importance to the savings these dependable machines deliver. Look to Signode for strapping machines built to steel mill standards.

First in steel strapping

SIGNODE STEEL STRAPPING CO.

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Only a vacuum inside this giant furnace permits the high purification that makes possible many amazing new metals and alloys. This furnace at ELECTROMET's Marietta, Ohio, plant is over 100 feet long—largest of its kind ever built. It produces new high-purity chromium and manganese metals and very low-carbon ferrochromes which are major factors in the lower costs and improved properties of stainless steels and high-temperature alloys.

Vacuum processes also make possible the production and fabrication of capacitor-grade tantalum, reactor-grade columbium, and vanadium metal. These metals now make significant contributions to the aircraft, electronic, missile, and nuclear industries.

ELECTROMET scientists and engineers continually work toward further advancement in vacuum technology. At the same time, they develop new and useful alloys and metals . . . find practical solutions to customers' problems in using ferro-alloys.

Want to know more about recent developments in the field of vacuum-quality alloys and metals? ELECTROMET can help.

ELECTRO METALLURGICAL COMPANY, *Division of Union Carbide Corporation,* 30 East 42nd Street, New York 17, N. Y.

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FERRO-ALLOYS AND METALS

UNION CARBIDE

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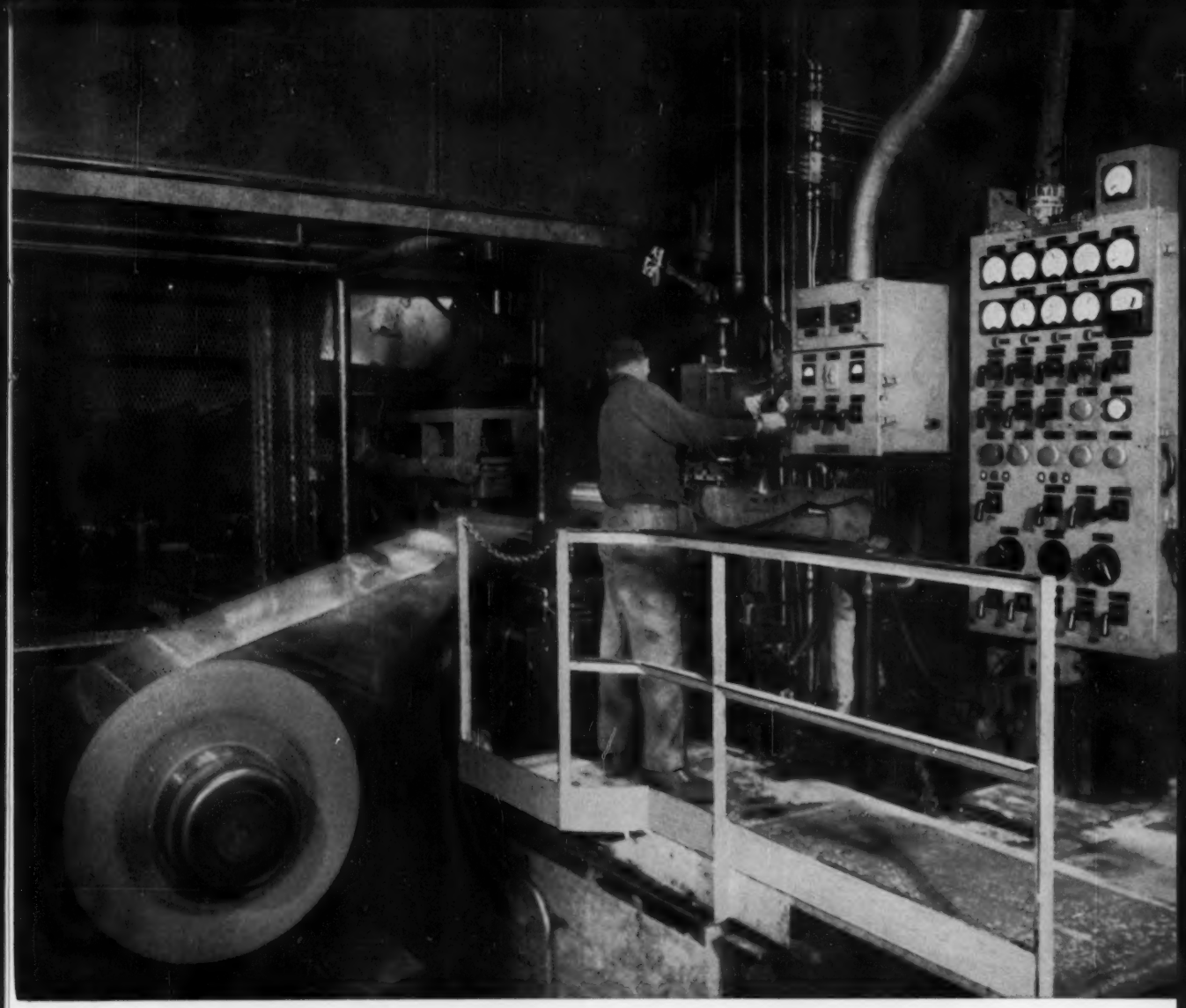


J-96121-1

AT 6000 FEET PER MINUTE...

Westinghouse Automatic Gauge Control on Wheeling Steel's New Tin Plate Mill Assures Plus/Minus .0001 Tolerances

In December, 1957, the new five-stand, 6000-fpm, tandem tin plate mill was officially put in service at Wheeling Steel Corporation's Yorkville, Ohio plant. The new 48" mill has 22,500-hp total drive capacity to produce tin plate and heavier strip at speeds up to 6000 fpm.

Westinghouse equipment is used, entirely, to Power-Up this modern installation. One of the most outstanding new developments utilized is the Automatic Gauge Control, designed and furnished by Westinghouse—a practical necessity on a high-speed mill of this type.

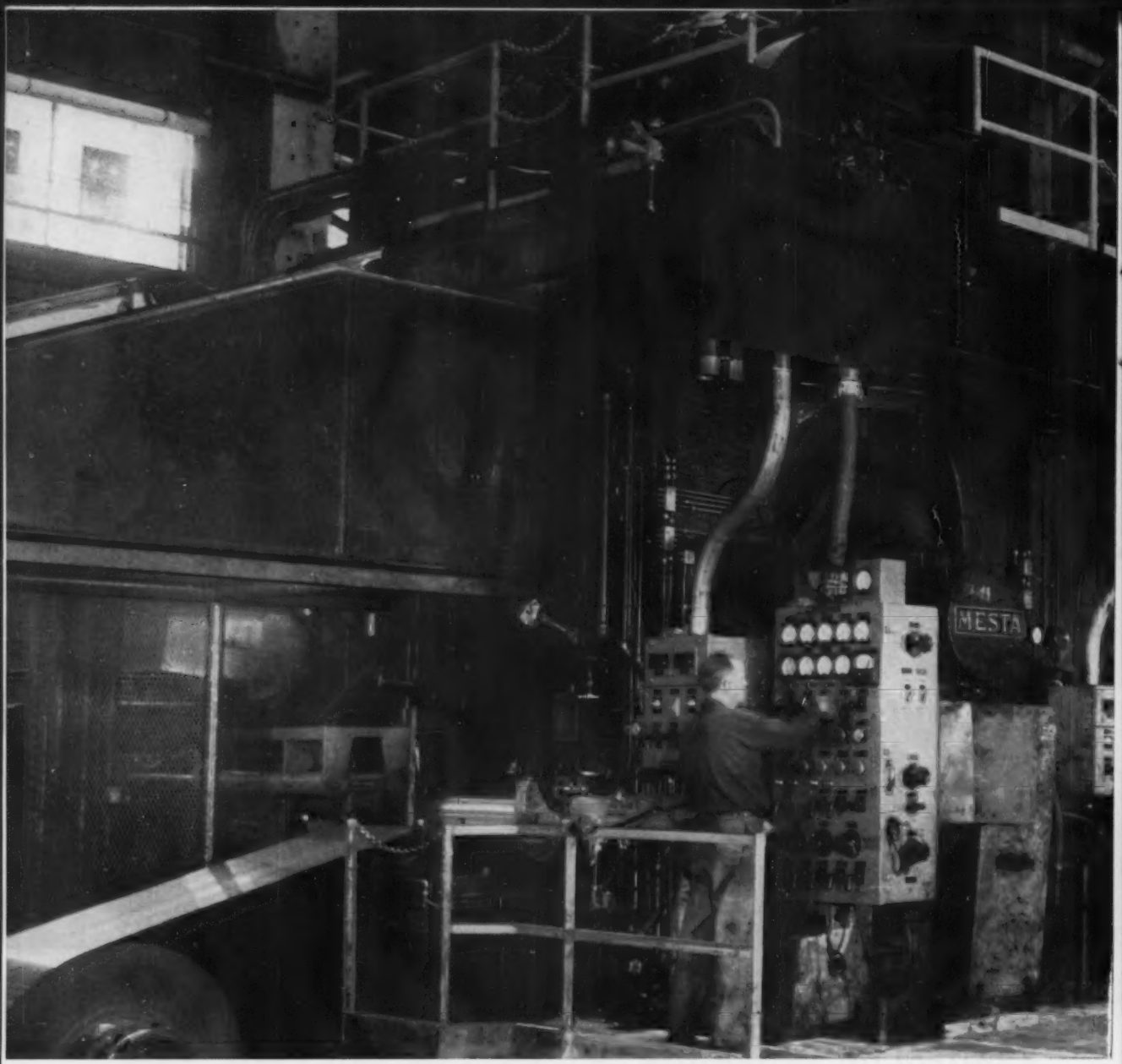
Other Westinghouse equipment furnished for this installation at Wheeling includes: main drive and all auxiliary motors, Magamp* regulators for main drive and variable voltage screwdown controls, M-G sets, brakes, outdoor substations, switchgear, power center, and control centers.

From planning to design, installation and start-up . . . Westinghouse can help you Power-Up. Consult your Westinghouse sales engineer for complete information. Or, write Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania.

*Trade-Mark

YOU CAN BE SURE...IF IT'S Westinghouse

Westinghouse Equipment Is Used Throughout the New Five-Stand Tandem Mill at Wheeling Steel Corporation's Yorkville Plant.



New Mill With Automatic Gauge Control Gives More Usable Strip From Every Coil--- Less Production Time Loss

With the automatic gauge control, strip thickness is continually gauged and recorded. Through feedback of signals, the mill automatically adjusts for any variation. Gauge control starts at #1 Stand, controlling the #1 Screwdown to minimize incoming variations. It thereby assures a uniform strip continuously to the mill.

The gauge control at #5 Stand controls the #5 Stand and the reel to adjust the strip tensions and maintain constant gauge of finished strip. The use of this new gauge control assures continuing close tolerance (to within plus/minus .0001) without production slowdown or unnecessary interruption.

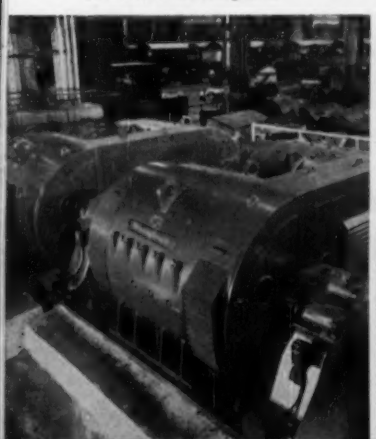
YOU CAN BE SURE...IF IT'S Westinghouse

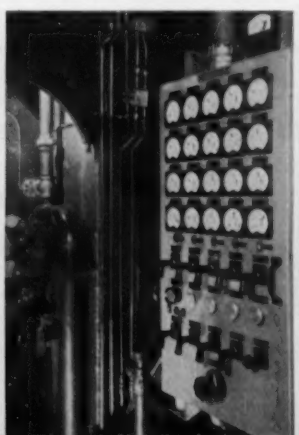
Two 3000-hp double armature motors for #5 Stand twin drive. Side-by-side mounting conserves floor space.

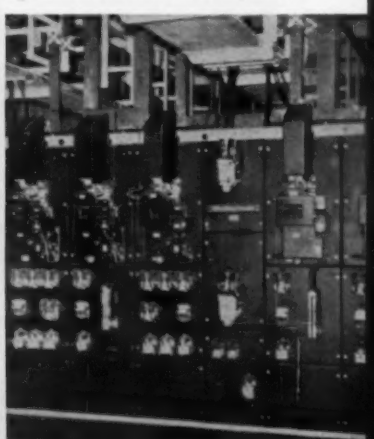
Tensiometer between stands shows strip tensions to guide operators in control of mill, and Westinghouse circular scale meters give maximum readability in minimum panel space.

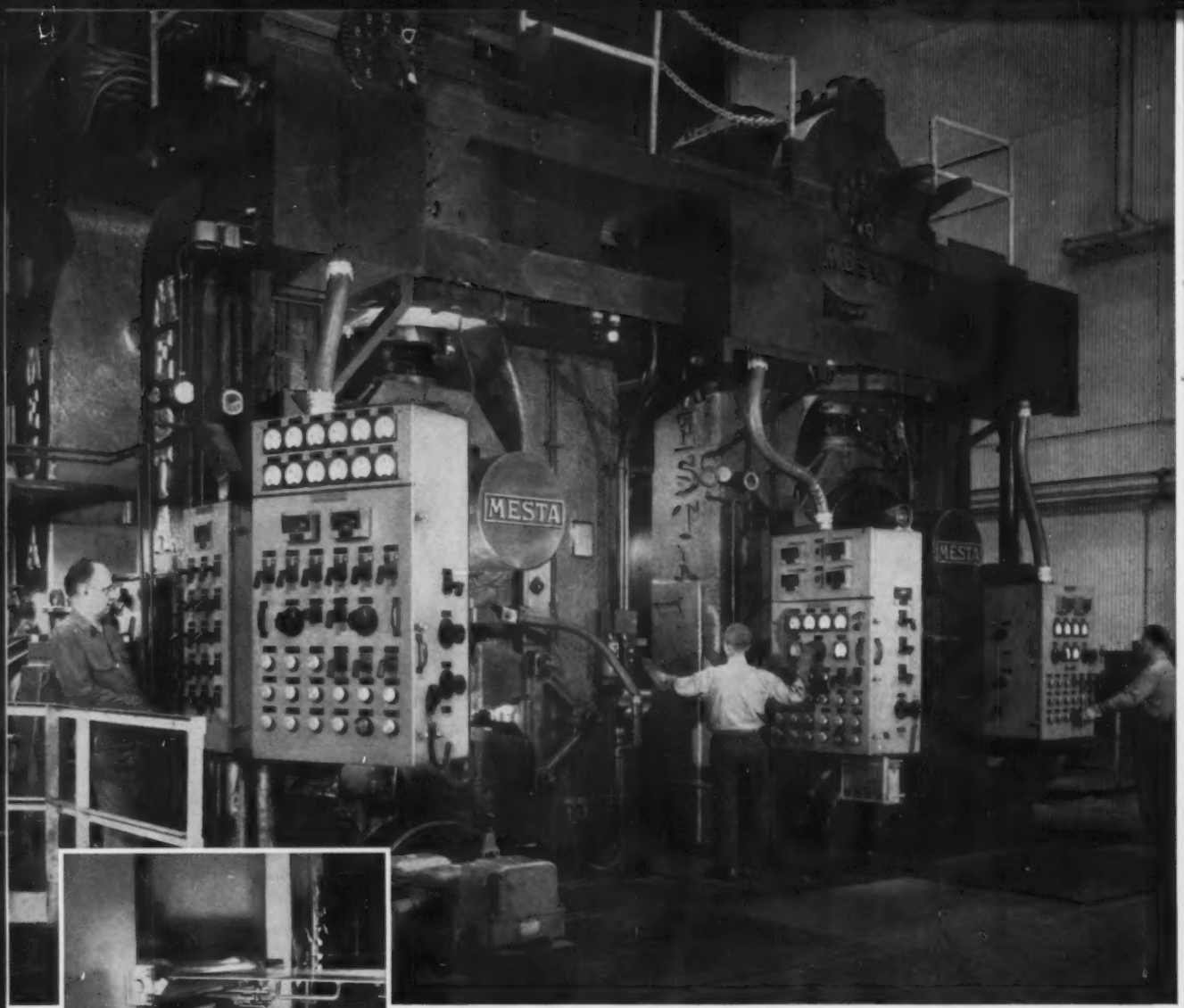
View of motor room showing main and screwdown M-G sets, switchgear and power center. Controls located on balcony at right.

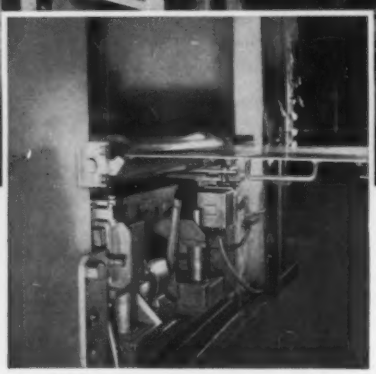
#5 Stand motor and generator line control panels. All circuit breaker and dynamic braking panels are located in basement.





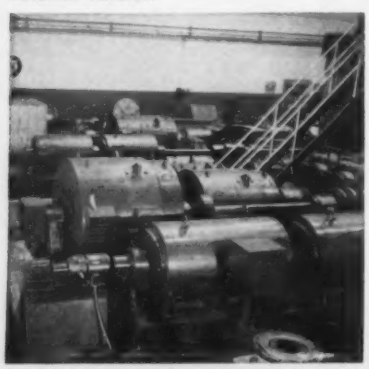






Regulating tensiometer controls #1 Stand to maintain constant tension in strip between stands 1 and 2.

Temper mill main drives. The entry and delivery tension roll twin drives feature special small-diameter machines to enable direct coupling to rolls on 20" vertical centers.



Westinghouse-Powered Temper Mill at Wheeling Gives Higher Tonnage—Less Scrap

As part of their Power-Up program, the Wheeling Steel Corporation recently installed a new 48" two-stand temper-pass mill, rated at 5000 fpm, equipped with 4600 total horsepower.

This Westinghouse equipped mill has increased the amount of strip produced as well as guaranteeing a better product because of the improved control possible.

Westinghouse equipment furnished includes: main drive and auxiliary motors, M-G set, switchgear, control centers and operating controls.

J-96121-4

YOU CAN BE SURE...IF IT'S Westinghouse

SCHLOEMANN

1. Singly movable heads
2. Jointly movable heads
3. Movable carriage
4. Charger and discharger
5. Prefill-water station
6. Pressure water station
7. Control desk

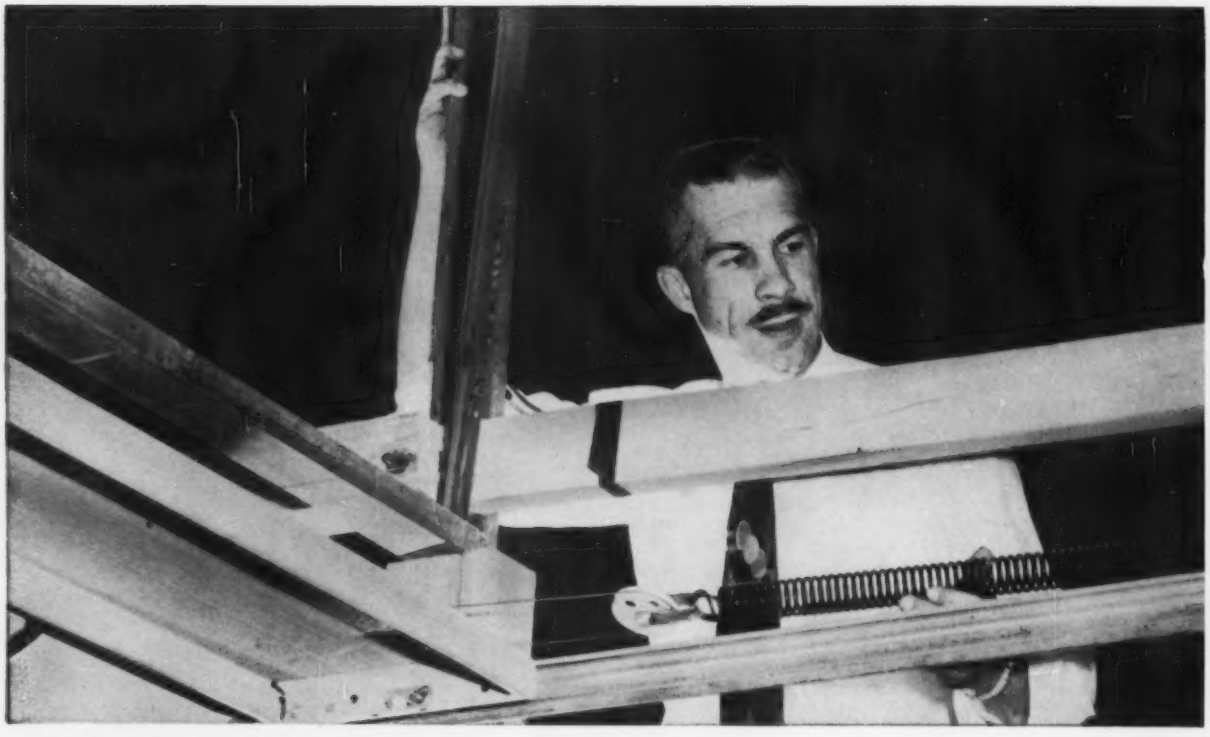
Photo: Courtesy of Jones & Laughlin Steel Corp.

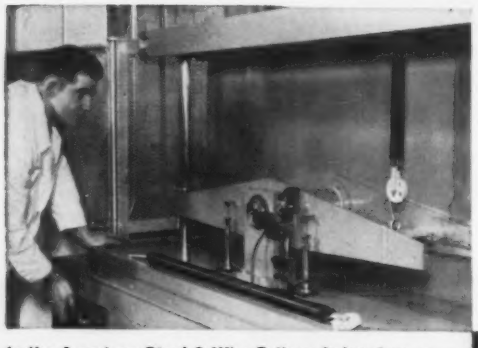
An outstanding machine now in successful operation at Jones & Laughlin Steel Corporation is the Automatic SCHLOEMANN Five-Tube Tester. Up to 1,200 tubes per hour can be hydrostatically tested in this machine, by either the face-sealing, or cup-sealing method. Automatic defective tube assorting device can be furnished. Only one operator needed. *For complete information send for leaflet 31/1e.*

SCHLOEMANN Tube Testers for the U.S.A. and Canada are manufactured by the AETNA-STANDARD Engineering Company.

FELLER ENGINEERING COMPANY 1160 Empire Building, Pittsburgh 22, Pa.

HOT AND COLD ROLLING MILLS • COUNTERBLOW HAMMERS • HYDRAULIC PRESSES



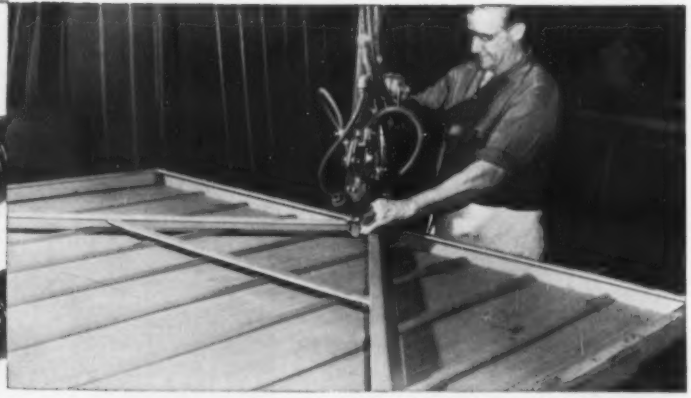


At Steel Door . . .

USS American Springs

thanks to AS&W

In the American Steel & Wire Fatigue Laboratory, a technician runs tests on a USS American Spring, designed for Steel Door use. On the basis of this test a change in hook design was recommended to give longer spring life.



A Steel Door workman assembles a Berry One-Piece Door. This company uses steel exclusively for all doors because of its many consumer advantages. Steel is stable, won't warp or swell. Steel doors need less maintenance and preparation, and steel doors are easy to operate.

This close-up shows the improved hook on the extension springs supplied by American Steel & Wire for the Steel Door overhead garage doors.

stretched 31,000 times and still going strong...

Spring Engineering Research Service

The Steel Door Corporation, Birmingham, Michigan, is the world's largest manufacturer of residential garage doors. For the production of these doors they use about 150,000 USS American Springs every year. Steel Door asked American Steel & Wire for a statistical evaluation of the fatigue life of the extension hook-type springs they use. The AS&W Spring Engineering Research Service tested these springs in the Fatigue Laboratory and recommended a change in hook design.

So successful was this design change that the life of the springs has been materially increased. At the Steel Door plant a cycle test was set up using USS American Springs on an overhead door. At the present time these springs have completed over 31,000 cycles without showing any sign of failure. This is the equivalent of 25 years of normal usage.

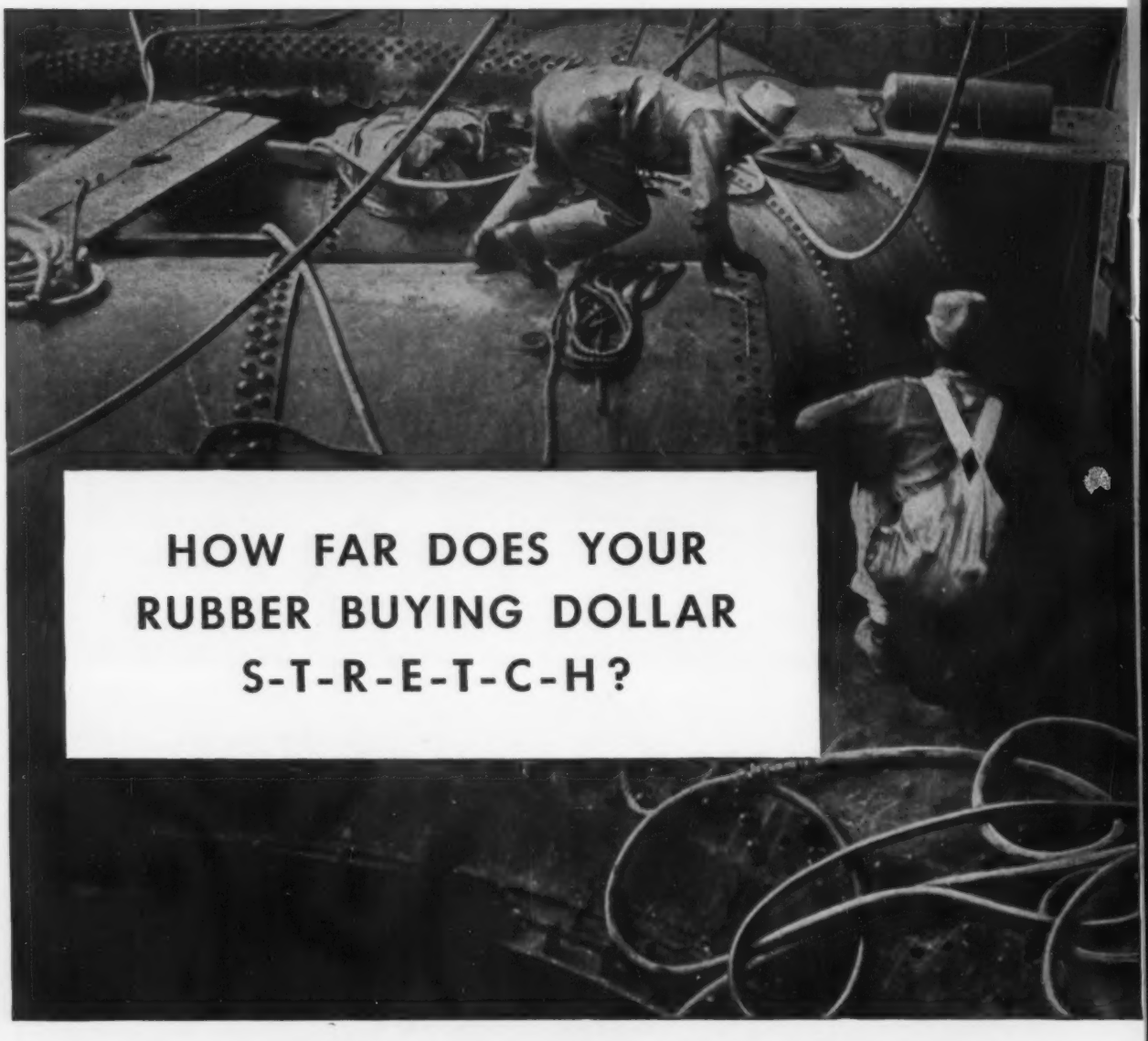
Mr. Ralph Qualman, Advertising Director and Service Manager, says: "It is extremely important that the springs—especially those used on sectional doors where the strain is greatest—have proper tension and a long life. American Steel & Wire supplies Steel Door with springs that meet their engineering specification and life expectancy."

If you have a spring problem or would like advice on the use of springs in your product, get in touch with our general offices in Cleveland, or any American Steel & Wire Sales Office. You can benefit from the knowledge of AS&W's Spring Engineering Research Service. The Service has been engaged in laboratory experiments of static and dynamic testing for 20 years and has accumulated invaluable data on stress and fatigue life of steel springs, while endeavoring to improve efficiency in the use of steel—from steel chemistry through product application—to more economically cope with today's rigorous demands. This accumulated knowledge of the AS&W Spring Engineering Research Service is at your disposal. *American Steel & Wire, General Offices: Rockefeller Building, Cleveland 13, Ohio.*

USS and American are trademarks

American Steel & Wire Division of USS **United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors • United States Steel Export Company, Distributors Abroad



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..."More Use ~~per~~ for your Dollar"

Allflex is the first hose of its type made for all-purpose use with air, water, oil, gases—even mild chemicals. Strong, light, flexible as a rope, and kinkless . . . Allflex coils and uncoils freely in *any* direction for easier handling on any *job*. Exclusive long life features of Allflex Hose permit cost savings never before possible with popular-priced all-purpose industrial hose.

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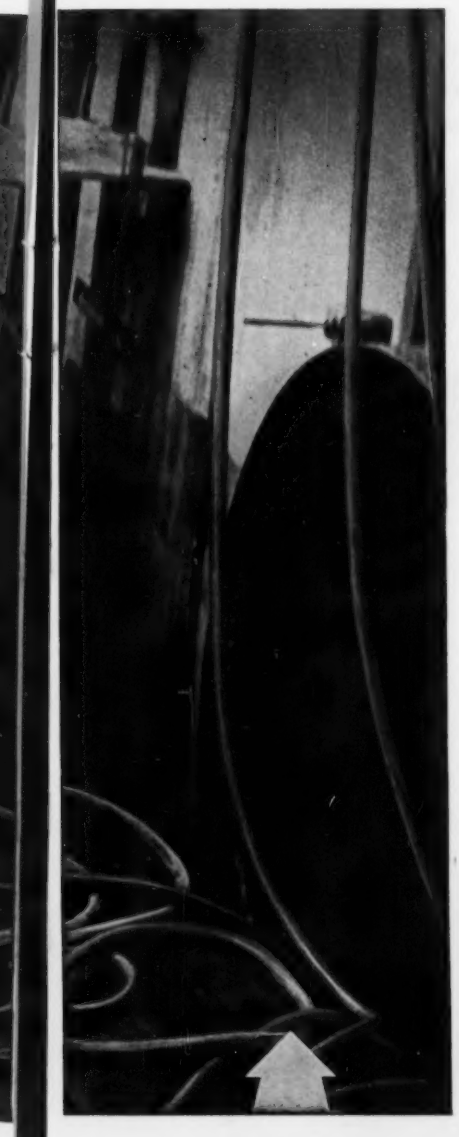
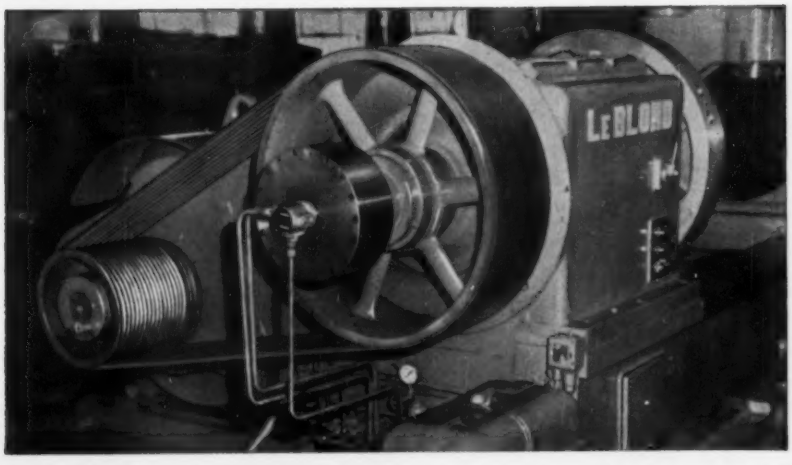
- Uniform Inside and Outside Diameters—Easier Coupling
- Light, Easy to Handle—Increases Production

Let an R/M representative show you how Allflex Hose will do a *better* job and *last longer* for your uses. Write for Bulletin #7075.





POLY-V® DRIVE—This new Poly-V* patented drive delivers up to 50% more power in the same space as a conventional multiple V-drive . . . or equal power in as little as ⅓ the space! Single unit belt permits narrow sheaves, less shaft overhang, less drive weight. Eliminates multiple V-belt "length matching" problems. More constant speed ratios, smoother running, longer drive life. Write for Bulletin # 6638.

*Poly-V is a registered Raybestos-Manhattan trademark.

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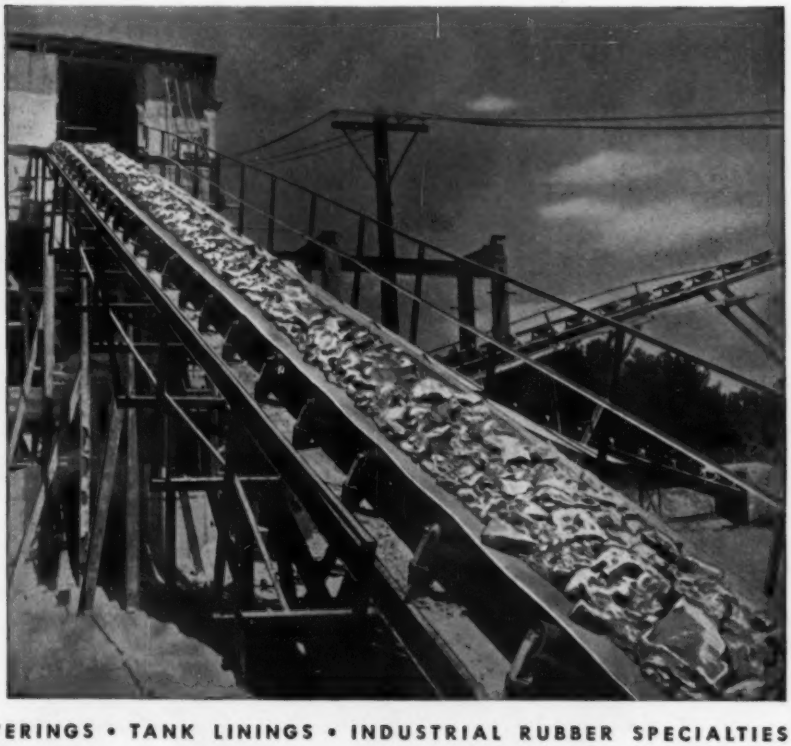

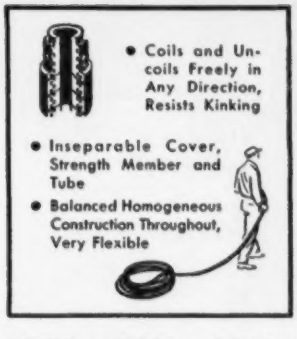

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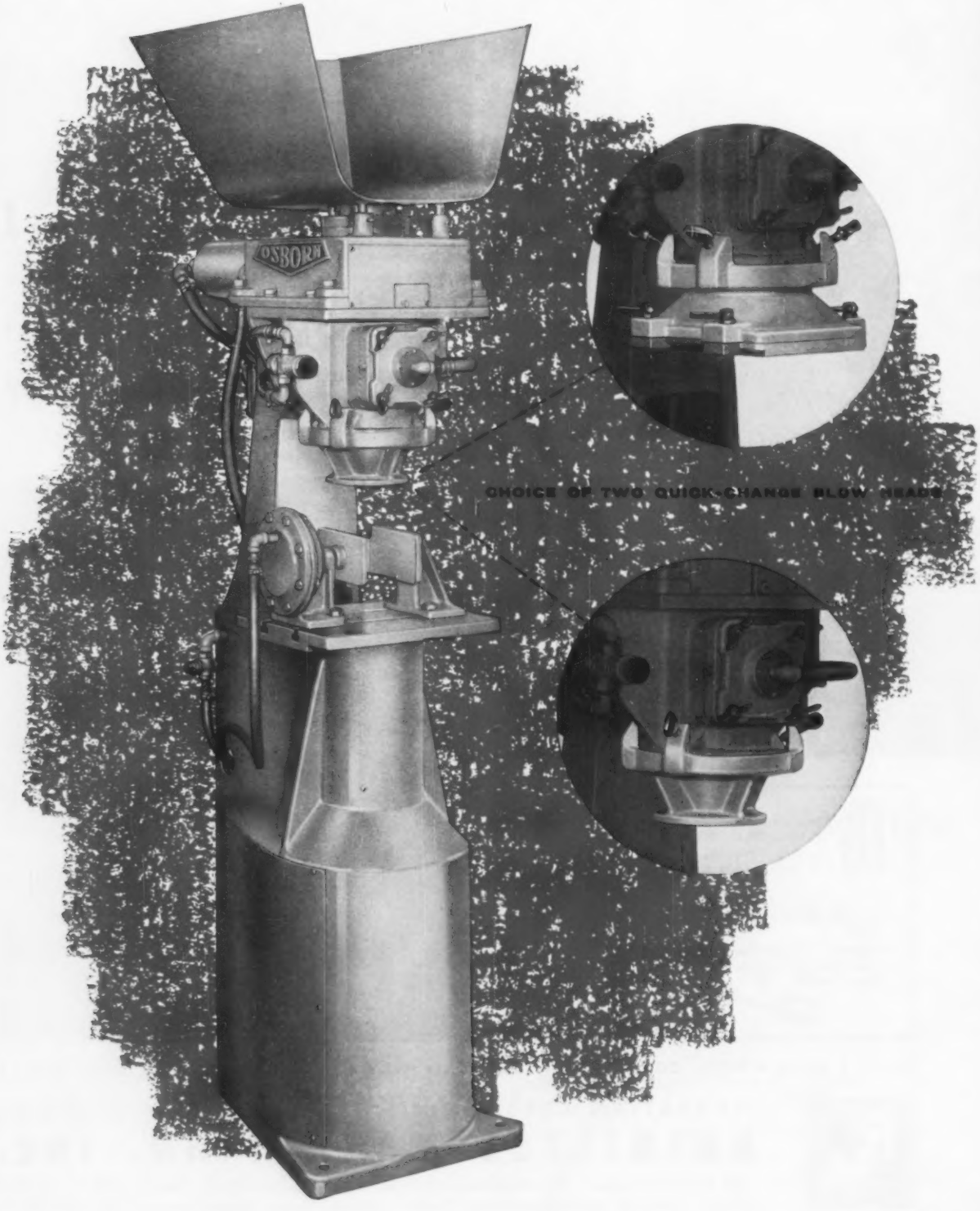

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SAND TO FINISHED CORE AUTOMATICALLY

AUTOMATIC CORE BLOWER

for low-cost, high production of quality small cores

Newest equipment development in Osborn's famous line of foundry production machinery is the Osborn JET-CORE Automatic Core Blower.

Designed for use in production, semi-production or jobbing foundries, the JET-CORE produces quality cores at extremely low cost . . . automatically . . . at high production rates.

Write us for full details on the new JET-CORE and how it can help you trim costs and boost foundry profits. *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

OSBORN JET-CORE FEATURES

- Automatic, single push-button operation.
- High-speed machine cycle time.
- Improved jet action blow.
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- Stationary head . . . no reservoir movement for filling.
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- Designed to deliver highest quality cores faster . . . at low cost.

leader in mechanization for the foundry OSBORN®

The Aluminum Man*...

* Former grid star and U. S. Navy pilot, Larry Sovanski—12 years a salesman for Alcoa distributor Metal Goods Corp. of St. Louis, Missouri—is typical of the men who serve industry through their knowledge of aluminum.

He helps expand construction frontiers

Industry is turning its attention increasingly to the unique construction advantages of *aluminum* structural shapes. And in case after case, it is *The Aluminum Man* who supplies the needed facts, information and material.

As the mill-trained salesman for your Alcoa distributor, *The Aluminum Man* offers detailed knowledge of aluminum structural shapes and their application—and the most complete selection in the industry. Behind him stand 70 years of experience and leadership by Alcoa—America's *pioneer* producer of aluminum!

Call *The Aluminum Man* on your next building project. His service and assistance are yours for the asking... whether you need a *few* pounds or *thousands* of pounds of Alcoa® Aluminum... the light metal with the bright future that's being seen in more places . . . more and more!

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TRowbridge 6-4680
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HUmbolt 5-5900
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Miller Steel Co., Inc., WAverly 6-6000
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Jones & Laughlin Steel Corp.
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STilwell 6-7737
Henry B. Lust (circles)
CIrcle 6-1748
Manhattan Brass & Copper Co.
WOrth 6-1200
Whitehead Metal Products Co., Inc.
WAtkins 4-1500
Rochester
Brace-Mueller-Huntley, Inc.
COngress 6-6560
Metal Supply, Inc. ... LOcust 2-4260
Sachs Metal Supply Co.
FAirview 8-1710
Syracuse
Brace-Mueller-Huntley, Inc.
HOward 3-3341
Whitehead Metal Products Co., Inc.
GRanite 4-4641

NORTH CAROLINA
Charlotte
Edgcomb Steel Co., FRanklin 5-3361

OHIO
Cincinnati
Central Steel & Wire Company
AVon 1-2230
Williams & Co., Inc.. . CApitol 1-3000
Cleveland
A. M. Castle & Co., Nottingham
Steel & Aluminum Division
ATlantic 1-5100
Williams & Co., Inc. ... UTah 1-5000
Columbus
Williams & Co., Inc.
AXminster 4-1623
Dayton
Ohio Metal & Manufacturing Co.
CLearwater 3-4192
Toledo
Williams & Co., Inc.
GReenwood 5-8661

OKLAHOMA
Tulsa
Metal Goods Corp. ... GIbson 7-4101

OREGON
Portland
Pacific Metal Co. ... CApitol 7-0693

PENNSYLVANIA
Philadelphia
Edgcomb Steel Co., GArfield 3-6300
Metal Supply Co., STevenson 7-0220
Whitehead Metal Products Co., Inc.
BAldwin 9-2323
Pittsburgh
Williams & Co., Inc. ... CEdar 1-8600
York
Edgcomb Steel Co. ... 47-1411

RHODE ISLAND
Slatersville
Edgcomb Steel of New England, Inc.
POplar 7-0900

SOUTH CAROLINA
Greenville
The J. M. Tull Metal &
Supply Co., Inc.... CEdar 3-8366

TENNESSEE
Memphis
Metal Goods Corp., WHitehall 8-3407

TEXAS
Dallas
Metal Goods Corp., FLeetwood 1-3271
Houston
Metal Goods Corp. ... FAirfax 3-0141

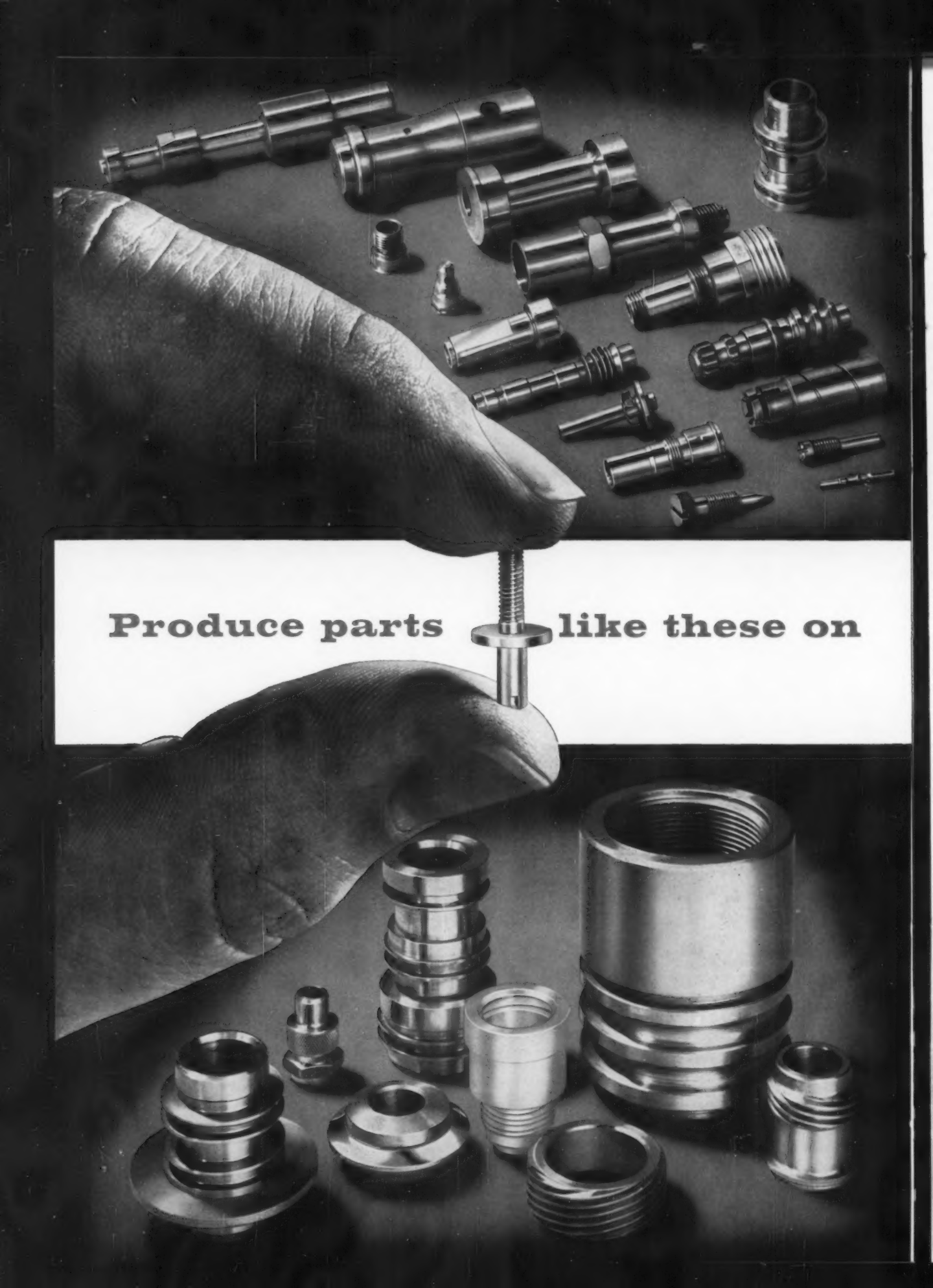
UTAH
Salt Lake City
Pacific Metals Company, Ltd.
DAvis 2-3461

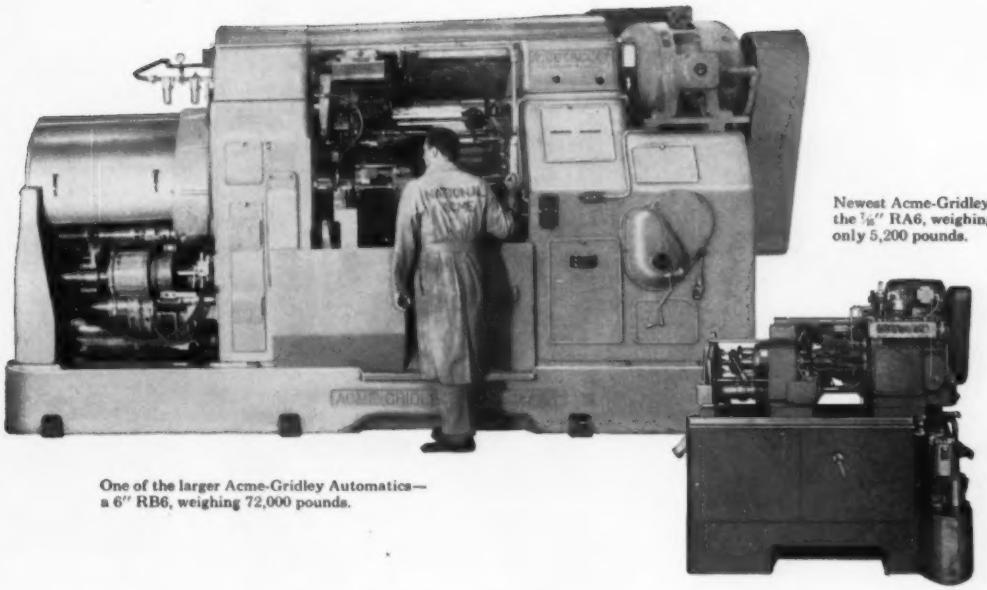
WASHINGTON
Seattle
Pacific Metal Co. ... MAin 2-6925

WISCONSIN
Milwaukee
Central Steel & Wire Company
HUmboldt 1-5000
Steel Sales Co. of Wisconsin
HIlltop 2-2020

Aluminum Products—Hawaii, Honolulu 14, **HAWAII**

Aluminum Company of America, 958-M Alcoa Building, Pittsburgh 19, Pennsylvania


Produce parts like these on



Newest Acme-Gridley—the $\frac{7}{16}$" RA6, weighing only 5,200 pounds.

One of the larger Acme-Gridley Automatics—a 6" RB6, weighing 72,000 pounds.

ACME-GRIDLEY automatics . . .

FORGET SECONDARY OPERATIONS!

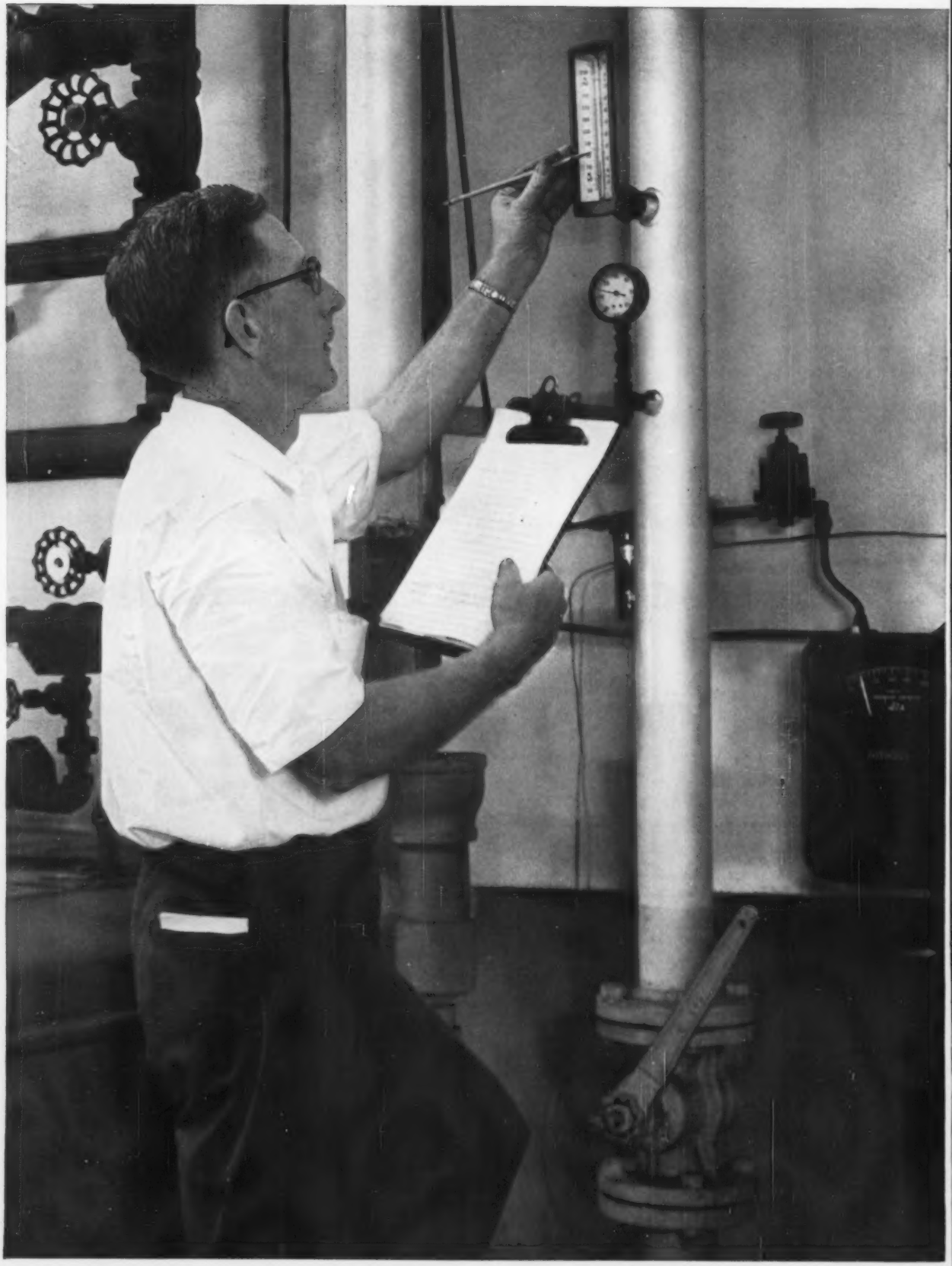
Most parts machined on Acme-Gridleys are *completed* on Acme-Gridleys. Using these Automatics, you eliminate costly rehandling and, in many instances, avoid a sizeable second-machine investment.

The advantage applies to parts weighing fractions of ounces or hundreds of pounds. And the wide-open tooling zone of every Acme-Gridley lends itself to a broad range of installations limited only by the tool engineer's ingenuity. It means that, for sheer capacity range, no line of automatic production equipment in the world equals Acme-Gridley.

If you produce parts like the ones illustrated, then Acme-Gridley Automatics must be in your present plans. Our representative can give you expert assistance without obligation.

National Acme

THE NATIONAL ACME COMPANY, 175 E. 131st ST., CLEVELAND 8, OHIO • Sales Offices: Newark 2, N.J., Chicago 6, Ill., Detroit 27, Mich.

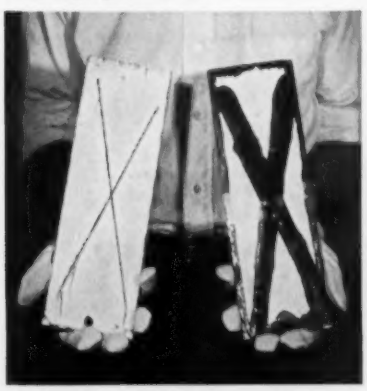


Read the Temperature and SAVE!

New Cold Bonderite System Cuts Heat Costs Up to 70%

The temperature gauges on the input lines of a typical Cold Bonderite System installation tell the story. 40° to 75° cooler in cleaner, rinse and Bonderite than in the conventional hot phosphating installation.

And all that heat saved translates into dollars saved, because chemical costs are comparable, as is the effective protection of the coatings produced.



Salt spray tests show effectiveness of coatings produced by Cold Bonderite System.

This is a thoroughly tested and proven system. The Cold Bonderite System is in use right now in many plants in many industries. And more are changing to it as they hear about the spectacular savings.

- A large automotive plant reports savings at the rate of 40 carloads of coal per year.
- An appliance manufacturer says the Cold Bonderite System is saving 5¢ per cabinet.
- Another manufacturer shut down one of his boilers because of reduced heat requirements.
- An automotive plant is saving about 12¢ per body.

There are other operational savings besides heat when you use the Cold Bonderite System. You'll use about 25% less water. You'll save electricity because you won't need to run an exhaust fan. You'll save on maintenance. You'll cut down-time, since there's no waiting for cool-off should service be required.

There are so many benefits and advantages to the new Cold Bonderite System that you can't afford not to investigate it for *your* plant.

Call or write today!

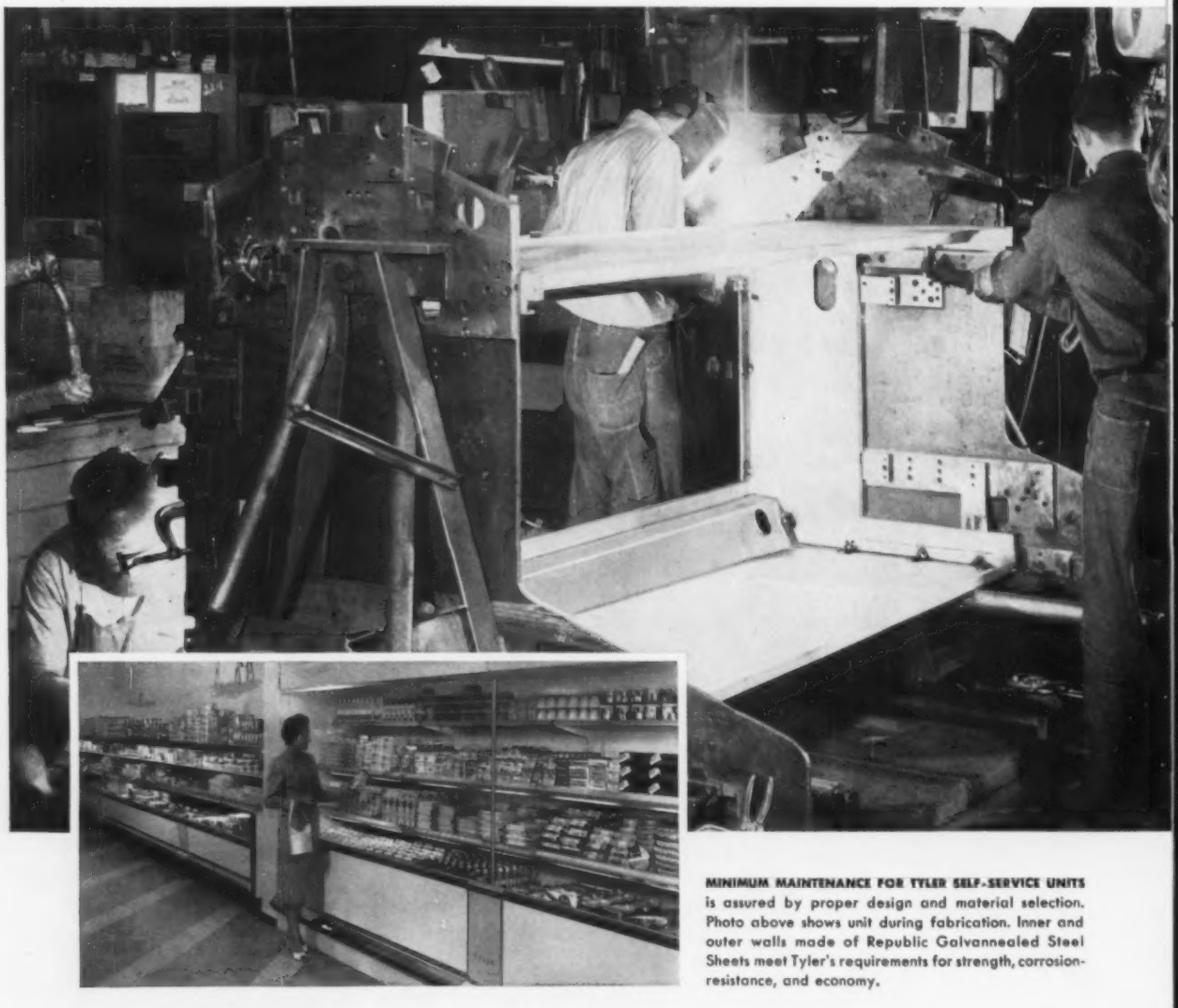
Parker quality and Parker dependability mean that your production lines will roll steadily and efficiently.

PARKER RUST PROOF COMPANY
2197 E. Milwaukee, Detroit 11, Michigan
Tel: TRinity 5-3377

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

Since 1914— leader in the field

*Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.



MINIMUM MAINTENANCE FOR TYLER SELF-SERVICE UNITS is assured by proper design and material selection. Photo above shows unit during fabrication. Inner and outer walls made of Republic Galvannealed Steel Sheets meet Tyler's requirements for strength, corrosion-resistance, and economy.

In Tyler Refrigerated Food Sales-Cases . . .

REPUBLIC GALVANNEALED SHEETS PROVIDE STRENGTH, CORROSION PROTECTION, ECONOMY

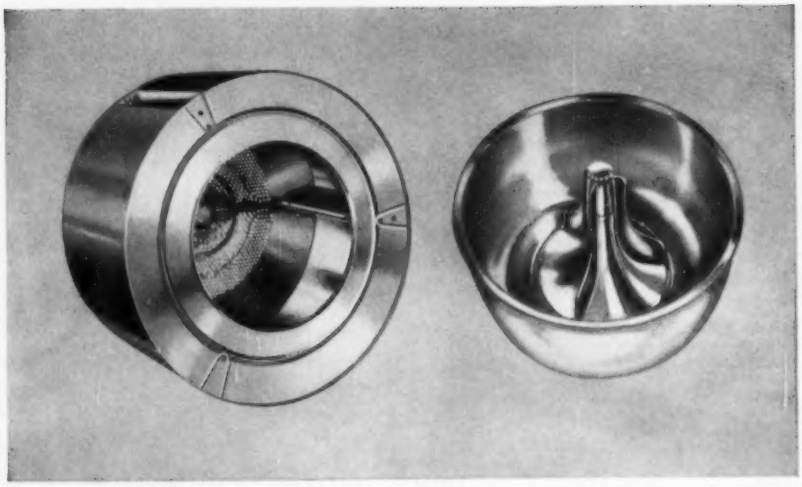
In the production of self-service refrigerated food sales-cases, the Tyler Refrigeration Corporation, Niles, Michigan and Waxahachie, Texas, maintains a common objective in design and material selection. This objective is reliability—the ability to withstand year-in, year-out use and abuse with minimum maintenance.

In keeping with this objective, Tyler has found Republic Galvannealed Sheets ideal for inner and outer walls. These interior parts call for strength and corrosion-resistance. Manufacturing requirements call for good ductility.

Republic Galvannealed Sheets meet all of these requirements and provide initial and long-term economy as well.

Republic Galvannealed has a proved record of performance in thousands of difficult product applications. Its tight, uniform zinc coating, furnace fired for further corrosion-resistance, will take all ordinary forming operations. It can be sheared, blanked, pierced, formed, flanged, soldered, deep drawn, beaded, and Pittsburgh Lock Seamed with ease.

Your Republic representative will be glad to discuss the many advantages of Republic Galvannealed Sheets in relation to your product or production requirements. Contact him today, or mail coupon for further information.



TOP PERFORMANCE AND SALES APPEAL ARE PROVIDED by the use of Republic ENDURO® Stainless Steel for both tub and drum in Speed Queen's Royal Pair Automatic Washer and Dryer. Speed Queen, a division of McGraw-Edison Company, Ripon, Wisconsin, specified ENDURO for two basic reasons. First, its gleaming, smooth, hard surface provides maximum protection for the finest fabrics. Second, ENDURO is unaffected by dyes, soaps, or detergents. These and other advantages may help you solve a product or production problem with ENDURO. Send coupon for data.

REPUBLIC MANUFACTURERS' COARSE WIRE to meet every production need. Box Binding and Stapling, Brush Handle, Chain, Garment Hanger are only a few of the qualities regularly produced. Large tonnages are shipped to manufacturers of fan guards, wire partitions, concrete reinforcing specialties, plated shelves, racks and grilles, and numerous other products. Republic wire metallurgists are available to help you in solving production problems. Write today.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. IA-6254A
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on:
- ☐ Continuous Galvanized Sheets
- ☐ ENDURO Stainless Steel
- ☐ Manufacturers' Wire

Name_____ Title_____

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Address_____

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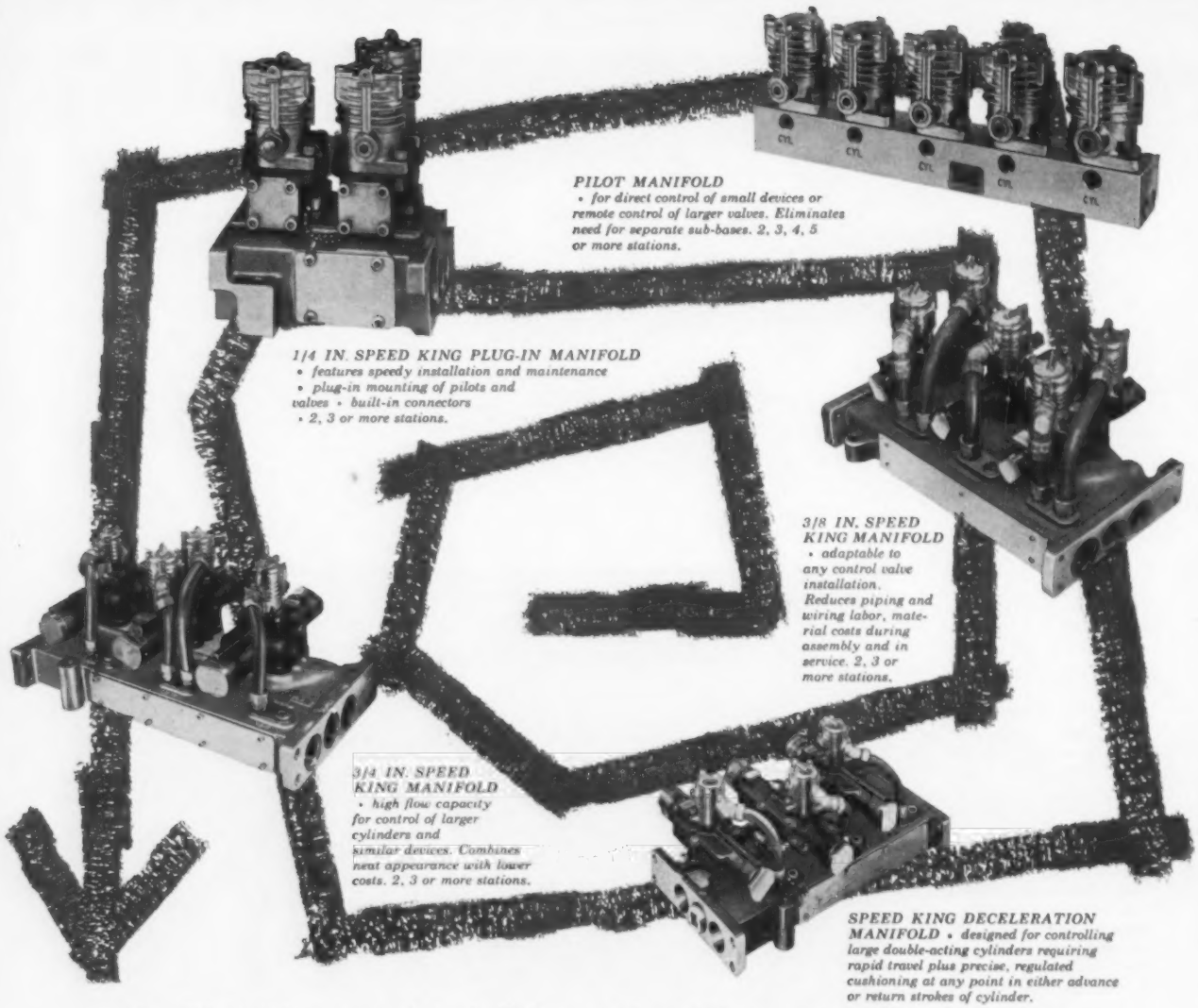

PILOT MANIFOLD
• for direct control of small devices or remote control of larger valves. Eliminates need for separate sub-bases. 2, 3, 4, 5 or more stations.
1/4 IN. SPEED KING PLUG-IN MANIFOLD
• features speedy installation and maintenance • plug-in mounting of pilots and valves • built-in connectors • 2, 3 or more stations.
3/8 IN. SPEED KING MANIFOLD
• adaptable to any control valve installation. Reduces piping and wiring labor, material costs during assembly and in service. 2, 3 or more stations.
3/4 IN. SPEED KING MANIFOLD
• high flow capacity for control of larger cylinders and similar devices. Combines neat appearance with lower costs. 2, 3 or more stations.
SPEED KING DECELERATION MANIFOLD • designed for controlling large double-acting cylinders requiring rapid travel plus precise, regulated cushioning at any point in either advance or return strokes of cylinder.

simplify piping . . . cut installation and maintenance costs . . .

use VALVAIR MANIFOLDS

. . . sizes and types for every application

Save space . . . save assembly time . . . save on piping and wiring material costs . . . improve machine appearance . . . up-grade reliability by eliminating unnecessary connections . . . specify Valvair manifold mounting for your multiple control valve installations.

Easy unit replacement speeds in-service maintenance, too . . . slashes machine down-time. Manifold sizes range from 1/4 to 1 inch NPT . . . in types and combinations *exactly* suited to your requirements. Valvair Corporation, 454 Morgan Ave., Akron 11, Ohio.

AA-9905

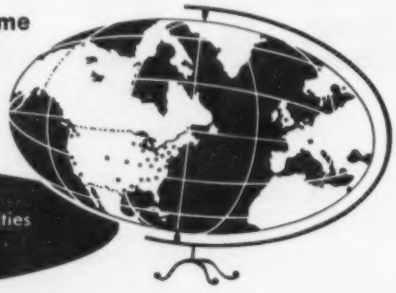
- **economical multiple mounting**
- **common inlet and exhaust ports**
- **bench wiring reduces installation time**
- **manifolds can be ganged to mount 2, 3, 4, 5, 6 or more valves**

Find us fast in the 'Yellow Pages'

Compare . . . and you'll buy

Valvair

SALES AND SERVICE FROM LOCAL STOCK



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DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION

Plants in Akron, Ohio; Canton, Pennsylvania; Birmingham, England; Amersfoort, Holland

Costs down, production up with Continuous-Cast Bronze Castings. There's no question about it—Asarco's unique process for producing continuous-cast shapes can save you money in many ways. And help you toward a better product in the bargain! For one thing, the alloys produced by continuous casting meet the same specifications as other castings but in performance, they're measurably superior. In fact, their greater strength and hardness open the way to cost-saving substitutions. And second, there's no greater production efficiency than working with the shapes you want in the continuous lengths you want, in dimensions closer to final finished parts. Write today for the cost-saving story on continuous castings. Continuous-Cast Products Department, American Smelting and Refining Company, Perth Amboy Plant, Barber, New Jersey; on the West Coast, Kingwell Bros., Ltd., 457 Minna St., San Francisco; in Canada, Federated Metals Canada, Ltd., Toronto and Montreal.

CONTINUOUS-CAST DEPARTMENT OF

ASARCO

AMERICAN SMELTING AND REFINING COMPANY

T. R. DREYER, Vice President—Brooklyn Manufacturing
American Machine & Foundry Company

a man who came to Fair Street

"The JIGMIL Technique enabled us to establish new manufacturing methods which provided greater accuracy, improvement in our product, substantial reductions in assembly time, and major reductions in machine time, all without investment in jigs."

"We accepted an invitation to go to Fair Street and there saw the JIGMIL Technique in operation doing boring and milling to high degrees of accuracy and economy. The potential savings in our own plant became apparent and we developed a JIGMIL program which resulted in new economies in our manufacturing methods. The inherent accuracy, power and rigidity of this machine tool, combined with its automatic positioning and ease of operation are especially adaptable to precision boring and milling operations on side frames and gear boxes. In addition to the noteworthy savings in boring time and reduced tooling cost, we gained the advantage of milling in the same setting at a minimum of cost."

T. R. DREYER

DEVLIEG MACHINE COMPANY, 450 FAIR STREET, FERNDALE • DETROIT 20,

SOME OF OUR JIGMIL USERS

Aerojet-General Corp.
American Can Co.
Avco Manufacturing Corp.
Baldwin-Lima-Hamilton Corp.
Beech Aircraft Corp.
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Boyar-Schultz Corp.
Carrier Corp.
Clark Equipment Co.
Continental Can Co., Inc.
Convair, A Division of General Dynamics Corp.
Crankshaft Machine Co.
The DeLaval Separator Co.
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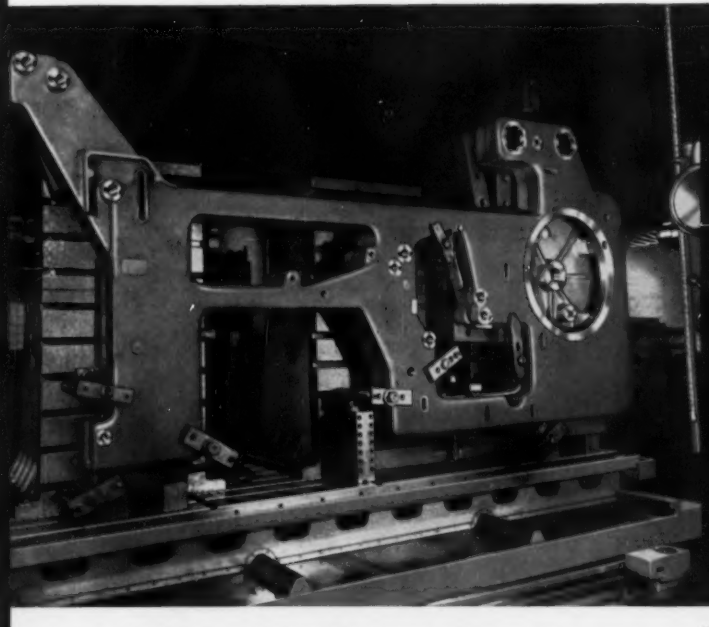


A FEW PROVEN ADVANTAGES OF THE JIGMIL TECHNIQUE—

- Eliminates cost of expensive jigs and production delays resulting from their manufacture.
- Simplifies tooling.
- Employs automatic functions to reduce factors of human error even in close tolerance work.
- Makes possible greater flexibility of product design.
- Improves end product by permitting interchangeable assembly of parts without hand fitting.
- Increases production and product accuracy.

ACCURACY IS AN ECONOMY!

A TYPICAL EXAMPLE OF JIGMIL VERSATILITY

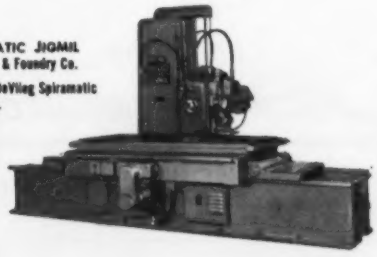
AMF uses the JIGMIL Technique for machining a multitude of components for their cigarette making machines, bread-wrapping machines, automatic pin setters, cigar making machines and many others. Illustrated is a pair of bread-wrapper side frames set against angle blocks on a Model 4B-96 SPIRAMATIC JIGMIL. All boring and side milling operations were done on the JIGMIL in one setup. Previous time on conventional boring and milling machines was 10 hours per part. Time on the JIGMIL is 3 hours per part.

The Glenn L. Martin Co.
Michigan Tool Co.
North American Aviation, Inc.
Northrop Aircraft, Inc.
Otis Elevator Co.
Pratt & Whitney Aircraft Division, United Aircraft Corp.
Solar Aircraft Co.
Speco Division, Kelsey-Hayes Co.
Thompson Products, Inc.
United Shoe Machinery Corp.
Western Electric Co., Inc.
Yale and Towne Manufacturing Co.
York Corp.

WILL YOU BE THE NEXT TO VISIT FAIR STREET

Model 4B-96 SPIRAMATIC JIGMIL as used by American Machine & Foundry Co.

For complete information on DeVlieg Spiramatic Jigmils, send for new catalog.



MICHIGAN

DeVlieg

SPIRAMATIC JIGMILS®

ACCURATE HOLES AND FLAT SURFACES IN PRECISE LOCATIONS

"Today's commercial standards of flatness are obsolete"

Says Wm. H. Rose, President of Voss Engineering Company

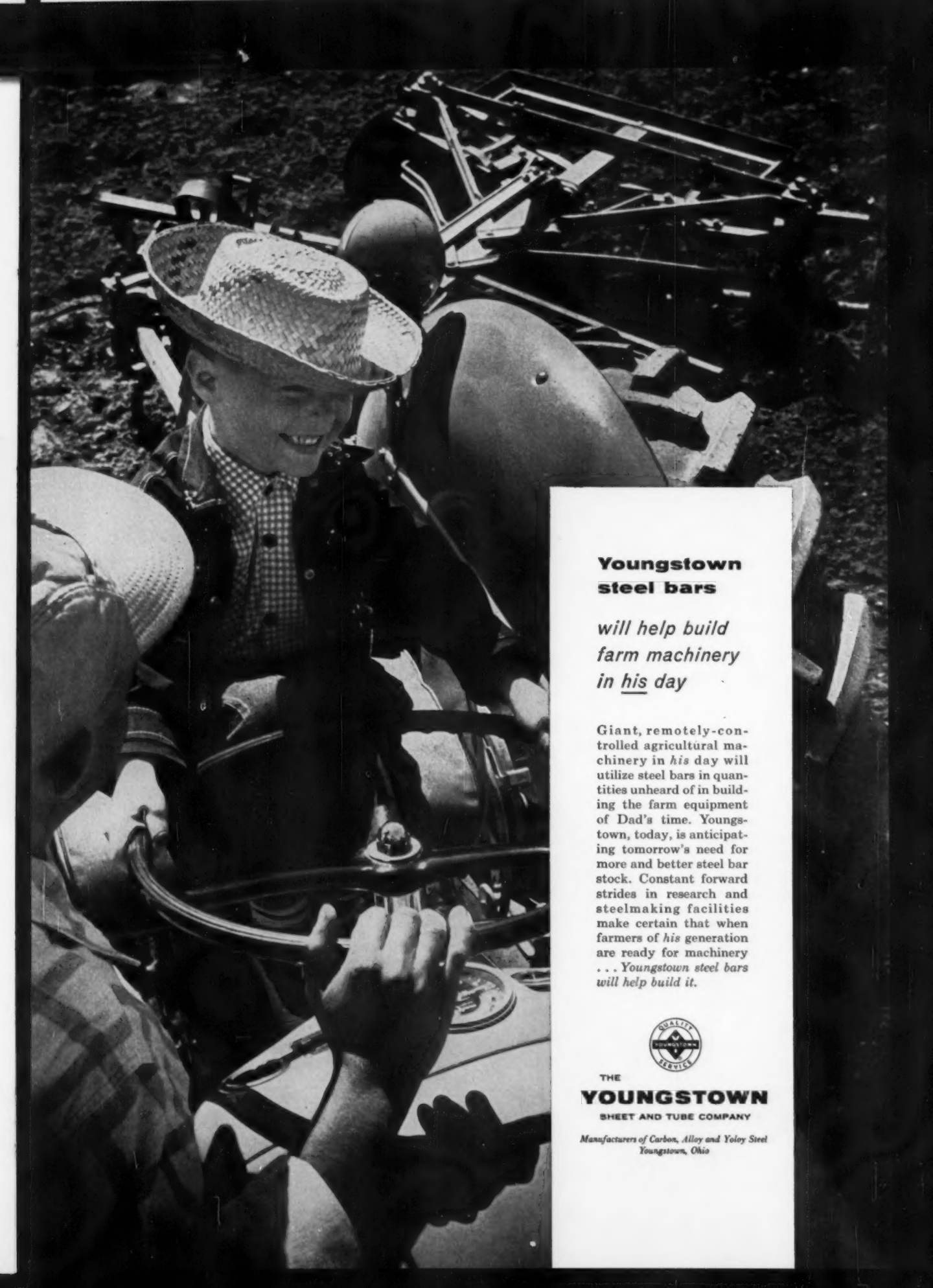
"Steel customers today won't willingly accept sheets or coils that meet only current commercial tolerances . . . and they don't want to pay extra for additional leveling operations."

Raise your flatness far above commercial standards with a Voss Inverted Roller Leveler. Voss gives precision leveling at high production speeds. Successfully in use on continuous coil lines producing over 1000 tons daily, Voss Levelers equal or exceed stretcher-level flatness in most hot or cold-rolled applications, and impart high non-fluting properties to galvanized steel.

Let us demonstrate the Voss-patented features that assure you precise area control and trouble-free operation. You can enjoy the advantages which leading steel and non-ferrous metal producers (including producers of high-tensile missile materials!) are obtaining with Voss Roller Levelers. Write today for booklet and list of users.

Voss ENGINEERING CO.

7301 Penn Ave. Pittsburgh 8, Pa. Churchill 2-4422



Youngstown steel bars

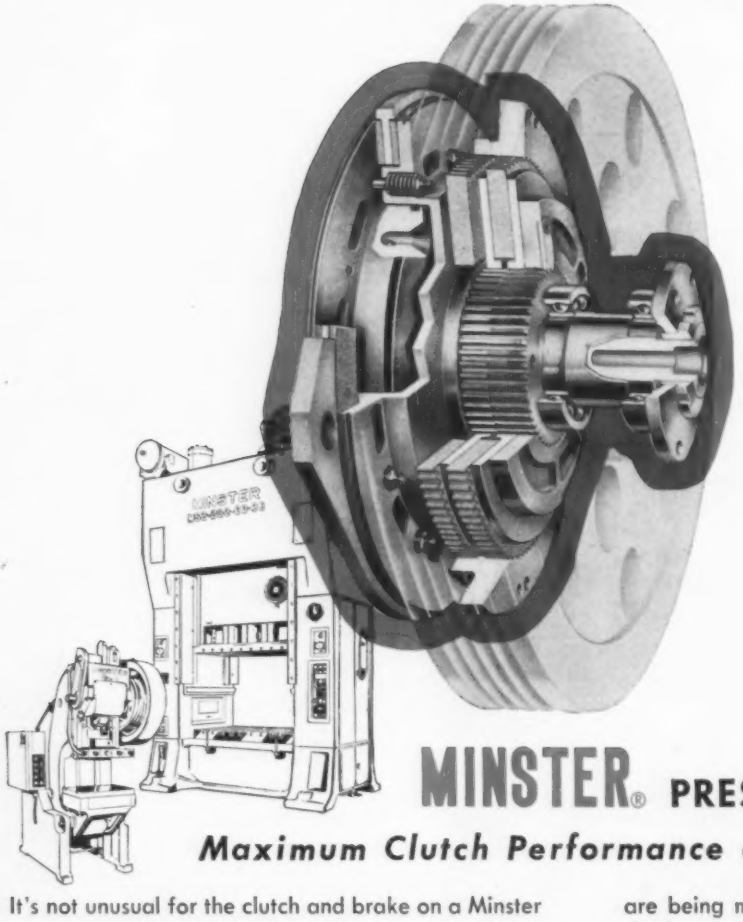
will help build farm machinery in his day

Giant, remotely-controlled agricultural machinery in *his* day will utilize steel bars in quantities unheard of in building the farm equipment of Dad's time. Youngstown, today, is anticipating tomorrow's need for more and better steel bar stock. Constant forward strides in research and steelmaking facilities make certain that when farmers of *his* generation are ready for machinery . . . *Youngstown steel bars will help build it.*

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel
Youngstown, Ohio

There's a BIG DIFFERENCE in AIR FRICTION CLUTCHES



THE MINSTER CLUTCH IS MORE EFFICIENT

MINSTER® PRESS USERS *Always Get Maximum Clutch Performance and Longest Clutch Life*

It's not unusual for the clutch and brake on a Minster press **to perform, shift after shift, on rapid single cycle operation for eight, ten or twelve years without ever being disassembled for relining.**

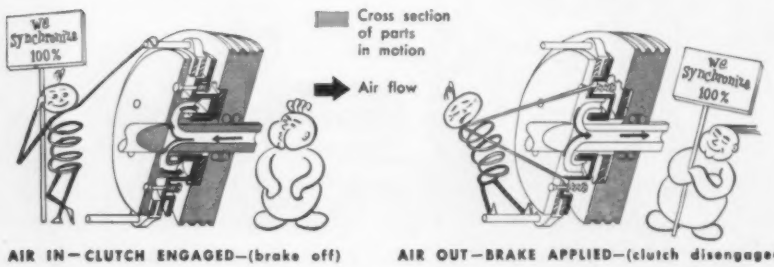
Users of all types and sizes of Minster presses consistently get that kind of service from the Minster patented Combination Air Friction Clutch and Brake.

Improvements in the design of the Minster clutch are being made continuously by Minster, **the press builder that developed and pioneered the air friction clutch for presses.** Performance records prove that, with a Minster clutch, the length of service and operational value is there.

Next time you're evaluating press equipment or considering a press clutch conversion, bear in mind, all air friction clutches are *not* alike.

THE MINSTER MACHINE COMPANY, MINSTER, OHIO

RUN **STOP**



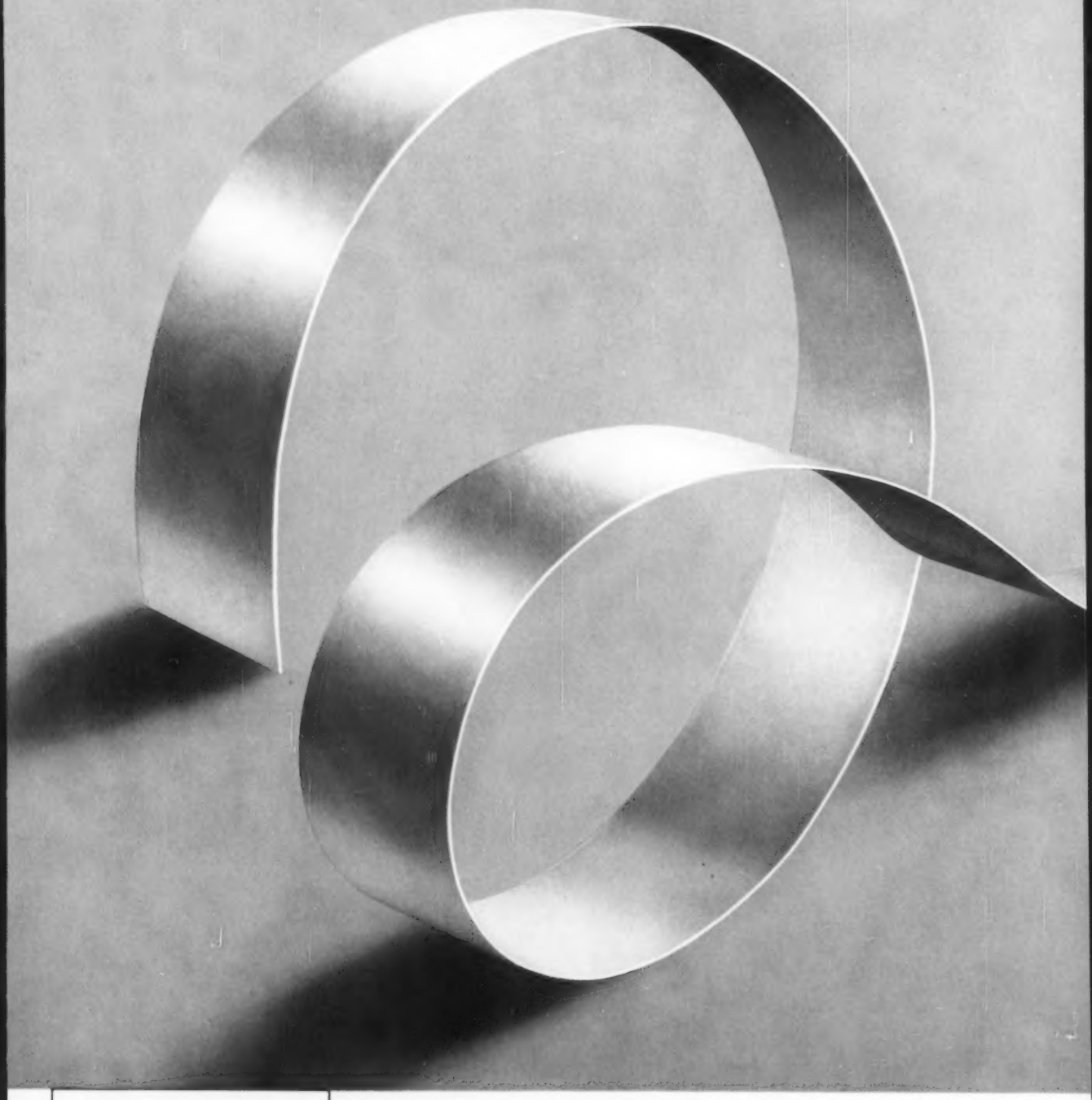
AIR IN—CLUTCH ENGAGED—(brake off) AIR OUT—BRAKE APPLIED—(clutch disengaged)

Compare the number of parts . . .

The Minster Combination Air Friction Clutch and Brake is one synchronized unit with one moving member engaging the clutch by air pressure in one direction and applying the brake in the opposite direction as air exhausts. Movement from full brake to complete engagement is the absolute minimum, assuring fast action at any speed for quick, controlled stopping.

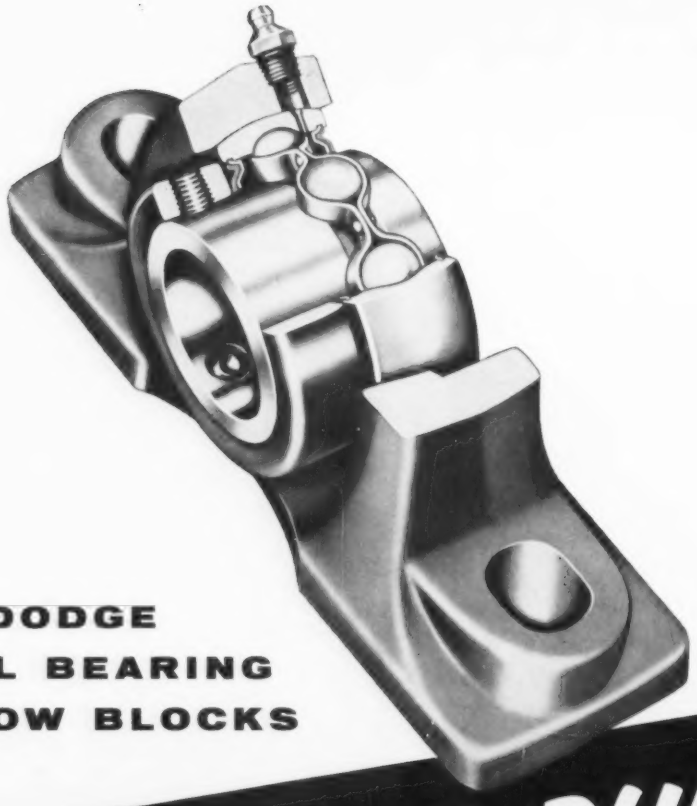
stainless strip—that reflects your specifications

Call Crucible to fulfill strict specifications for lustrous finish, uniform quality and gauge in stainless strip. For Crucible produces finishes of incomparable lustre by precision-rolling each coil on modern mills. Exact quality and gauge are consistently ensured because Crucible methodically checks each heat, measures gauges continuously with electronic controls. So why settle for less than strip that reflects your high standards? Call Crucible—a leading producer of stainless in gauges to .010" and in all widths. Or write: *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*



CRUCIBLE STEEL COMPANY OF AMERICA

Canadian Distributor—Railway and Power Engineering Corp., Ltd.



DODGE
BALL BEARING
PILLOW BLOCKS

PRECISION BUILT
– for normal and medium duty jobs

SC

NORMAL DUTY
SHAFT SIZES — 1/2" to 2-7/16"

SCM

MEDIUM DUTY
SHAFT SIZES — 1-7/16" to 3-1/2"

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

- ★ High quality at moderate cost.
- ★ Deep groove ball bearing provides high radial and thrust capacity.
- ★ Long inner race distributes load over greater shaft area.
- ★ Metal backed synthetic seals are locked in position. They can't blow. Effectively exclude dust and dirt.
- ★ Completely sealed both on and off the shaft.
- ★ Fully self-aligning.
- ★ Rugged one-piece semisteel outer housing.

Pillow blocks, flange bearings, piloted flange bearings, cylindrical units, hanger bearings, screw conveyor hanger bearings.
Call your local Dodge distributor — or write us for technical bulletin.

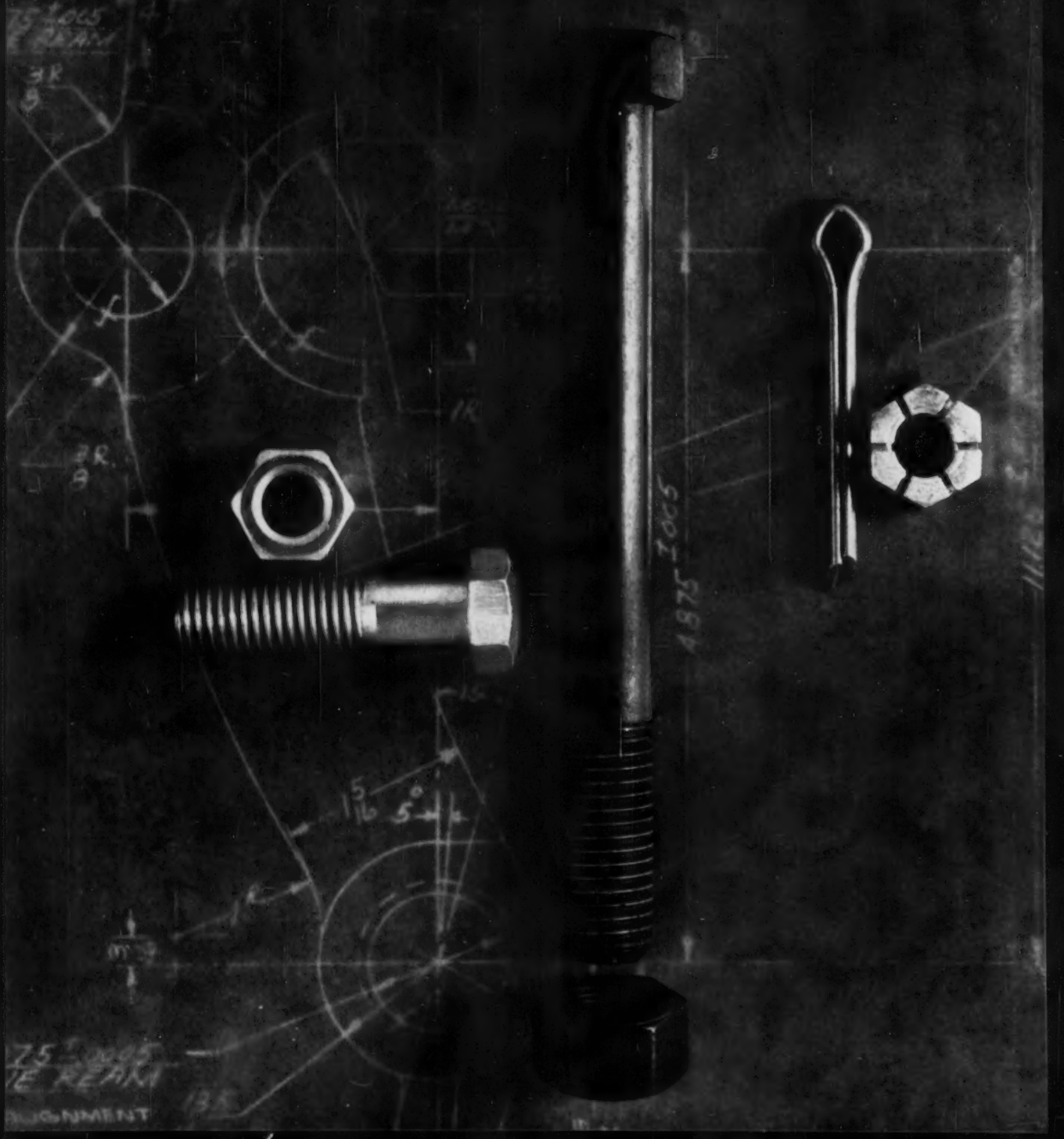
DODGE MANUFACTURING CORPORATION, 800 Union St., Mishawaka, Ind.

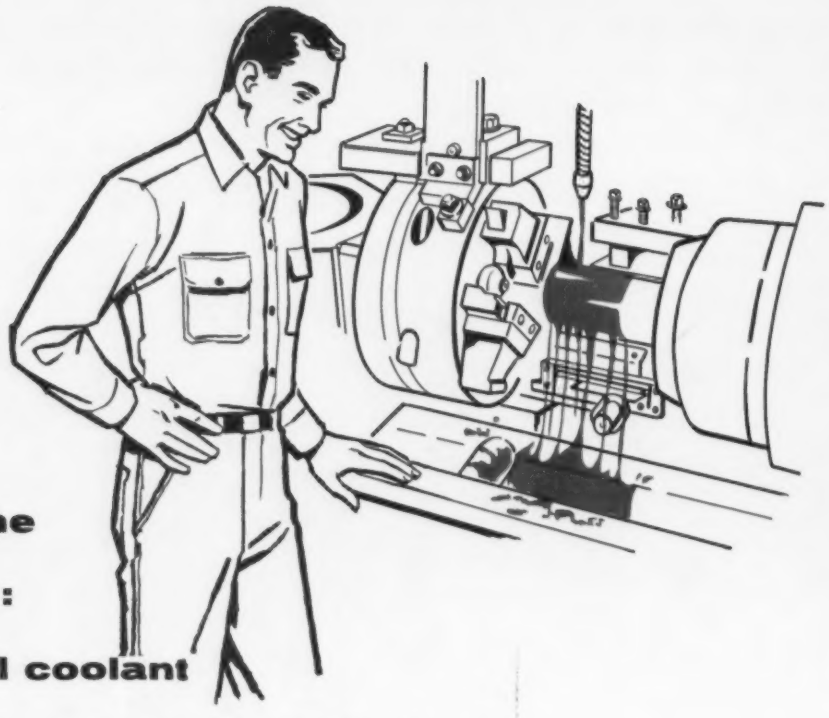
DODGE
of Mishawaka, Ind.

Every fastener we make is statistically quality controlled ...even though made in the millions. Only the most modern methods and equipment are used. When you ask for Lamson fasteners – whether standards or specials – you know you're getting the very best. Men who make decisions involving company money have come to expect and depend on this kind of product from us.

The Lamson & Sessions Co.

5000 Tiedeman Road, Cleveland 9, Ohio • Plants at Cleveland and Kent, Ohio • Chicago • Birmingham



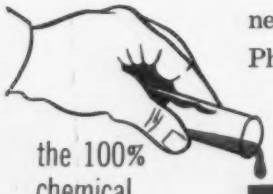


. . . And some people said: "a chemical coolant could not be a good lubricant!"

But now the lubricity of Houghton chemical coolants has amazed a lot of metalworking men. Houghton chemistry has produced a synthetic high molecular weight lubricity additive, resulting in a 100% chemical cutting base that lubricates better than most soluble oils.

Now you can have all the advantages of a chemical coolant on almost all regular machining jobs . . . fast wetting, rapid penetration, cool tools and cool work, sure protection from welding and chip buildup. The price in the machine, 6 cents per gallon, or less, depending on dilution.

You'll never need to worry about new HOCUT 237 breaking down or turning rancid. It's a true solution, not an emulsion. And it puts a two-stage rust protection on the work—thorough, over-all protection made possible by HOCUT's great wetting power. Ask the Houghton Man about this amazing new coolant today—or write E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33, Pa. for Product Data Sheet.



the 100% chemical cutting coolant

HOCUT

a product of . . . E. F. HOUGHTON & CO.
Philadelphia • Chicago • Detroit • San Francisco

Ready to give you on-the-job service . . .

Turbine spiral case being fabricated of USS "T-1" Steel in the shop of the S. Morgan Smith Co., York, Pa. Plates ranged in thickness from ½" to 1 5/16".

Taming the mighty Snake River with turbine spiral cases of USS "T-1" Steel

Stronger steel reduces weight . . . cuts costs

Four of these huge spiral cases are being built for the Idaho Power Company for use in the Brownlee Dam on the Snake River near Robinette, Oregon. They are designed for a 250-foot head of water. The inlet is 18 feet in diameter and each turbine will generate 144,000 horsepower at a speed of 128.6 rpm. Water will flow through the cases at a rate of 5,460 cubic feet per second.

Because of the fierce pressure, it was obvious that a strong steel was required. USS "T-1"* Steel was selected because it has a minimum yield strength of 100,000 psi. What's more, it can be fabricated, is readily weldable and has a high resistance to impact abrasion.

Cost savings. By using USS* "T-1" Steel, there will be substantially less shipping weight across the country and less weld time and weld metal, both in the shop and on the job site. Had carbon steel been specified, double thicknesses would have been required.

Fabricating operations. Projection of the dimensional outline on the plates was done with Lumitrace. Plates were cut to size by flame-cutting and rolled cold to shape. Some parts were finish welded, others were tack welded and assembled. The spiral case was then disassembled and shipped. Finish welding of segments is to be done at the dam site.

This job points up the economies possible with the use of USS "T-1" Steel. Why not use it for your own equipment? Write for our "T-1" book containing complete information. United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

Remember that we also make USS COR-TEN*, USS TRI-TEN* and USS MAN-TEN* Steels . . . widely used in power generation equipment.

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

USS United States Steel

*TRADEMARK

This Sandusky Centrifugal Casting—one of four produced for Westinghouse Atomic Equipment Department—meets radiographic, intergranular corrosion, and all other rigorous chemical and physical tests.

ONE SANDUSKY CENTRIFUGAL CASTING ...makes 4 giant stator shells

Specified by Westinghouse for 4 canned motor pumps soon to be integral parts of reactor system in Yankee Atomic Electric Plant in Rowe, Massachusetts

One king-size 17-ton Sandusky casting supplied the main motor bodies (stator shells) for the four pumps being built by Westinghouse, each to handle 23,600 g.p.m. of pressurized water through the reactor core.

The 25-foot-long Sandusky casting was centrifugally spun of a modified CF-8 (Type 304 L) stainless steel, then machined by Sandusky to a 3" wall thickness, 31½" on the O.D. This huge casting was hydrostatically tested to 3800 psi before being sectioned into four 68" lengths.

These stator shells represent another *new and exacting application* for Sandusky Centrifugal Castings—which may offer a practical and economical answer to *your* cylindrical requirements also. They are available in diameters from 7" to 54"—in lengths up to 33 feet—in heat- and corrosion-resistant stainless, carbon and low-alloy steels and a wide range of copper-base and nickel-base alloys.

Let us show you how Sandusky Centrifugal Castings can help solve your cylindrical problems. Write to us at Sandusky, Ohio.

SANDUSKY CENTRIFUGAL CASTINGS

FOUNDRY & MACHINE CO.

SANDUSKY, OHIO Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

102,000 lbs. of steel was unloaded, sorted and stockpiled in one hour with the help of this American 300 Series Self Propelled Crane. A complete line of American Cranes and Excavators provide fast, maneuverable, versatile materials handling equipment for every application.

Working a clamshell bucket is just one of many jobs American DiesELectric Locomotive Cranes handle with cost-saving efficiency. This self contained crane will also work with hook, magnet, orange peel or grapple fronts —has ample power to switch railroad cars, too!

TRIGGER FAST AIR CONTROLS BOOST CRANE'S OUTPUT 20%

Fast, highly responsive air controls actually increase the daily production output of big American DiesELectric* Locomotive Cranes by 20%! Leading firms in the country's heavy industries have swung to American for their volume materials handling jobs. These cost-conscious firms have learned that the American's patented diesel-electric power system cuts operating costs sharply. Electrically driven trucks provide smooth switching and car spotting power while reducing maintenance costs up to 50%! Dependable diesel power on the machinery deck results in low cost materials handling power.

A variety of fronts . . . hook, clamshell, magnet, orange peel or grapple . . . provides every industry with a versatile, heavy duty, high production machine that will pay for itself in a hurry.

If you're interested in boosting handling volume while trimming costs, investigate American's new concept in crane design—the DiesELectric Locomotive Crane! Specifications on this complete line offering capacities from 25 to 130 tons are available immediately by writing:

*trademark

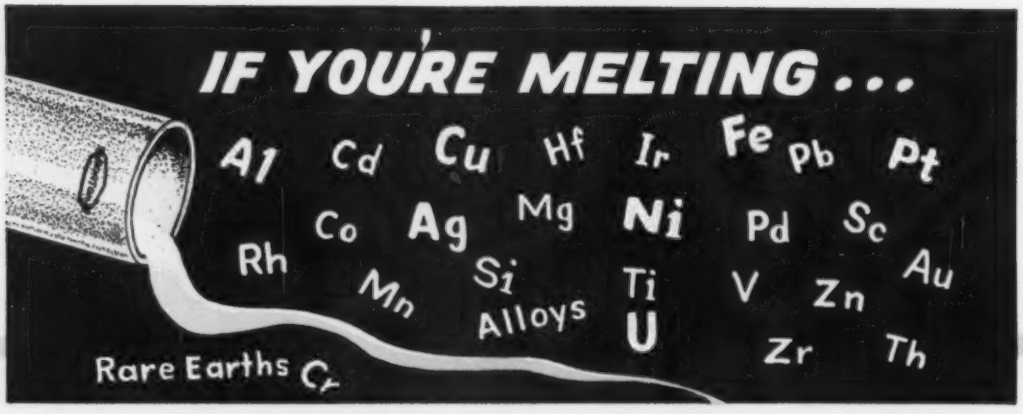
EXCAVATORS-CRANES to 2 yds.-50 tons
LOCOMOTIVE CRANES to 130 tons
DERRICKS-HOISTS to 800 tons
REVOLVER CRANES to 400 tons

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

AMERICAN HOIST PACIFIC COMPANY
Special materials handling equipment

CROSBY-LAUGHLIN DIVISION
Drop forged fittings for wire rope-chain

A limited number of locomotive cranes available for rental service



Norton crucibles, available in many materials, meet a wide range of needs

HEAVY WALL CRUCIBLES

Furnace Sizes in Pounds	Outside Diameters	Wall Thicknesses	Over-All Heights
½ to 300	1⅛" to 12¼"	⅛" to ⅝"	3½" to 16½"

Materials Available

ALUNDUM*	"A" 99% Alumina	All Sizes Shown	ZIRCONIA	"H" Fused Stabilized Zirconia	All Sizes Shown
CRYSTOLON*	"G" First Quality Silicon Carbide	All Sizes Shown	THORIA		½ to 50 lbs.
CRYSTOLON	"N" Nitride Bonded Silicon Carbide	All Sizes Shown	URANIA		½ to 50 lbs.
MAGNORITE*	"K" 97% Fused Magnesia	All Sizes Shown			

LIGHT WALL CRUCIBLES

Furnace Sizes in Pounds	Outside Diameters	Wall Thicknesses	Over-All Heights
½ to 50	1 5/32" to 5 13/16"	3/32" to 5/32"	3½" to 10 11/16"

Materials Available

ALUNDUM	"A" 99% Alumina	½ to 50 lbs.	ZIRCONIA	"H" Fused Stabilized Zirconia	½ to 50 lbs.
MAGNORITE	"M" 99% Fused Magnesia	½ to 50 lbs.	THORIA		½ to 17 lbs.

Norton crucibles are *engineered and prescribed* for a long list of metal melting operations. Available in a wide range of materials, sizes and types — as shown in the tables — they provide long, trouble-free service, protect your product purity and meet specific melting requirements.

Norton heavy wall crucibles, exceptionally strong and dense, are used for most induction furnace melting jobs. Thin wall crucibles, generally of lower porosity, are particularly suited for special and nuclear metallurgical processes. Their fine, smooth surface is particularly valuable for protecting high purity metals from refractory inclusions.

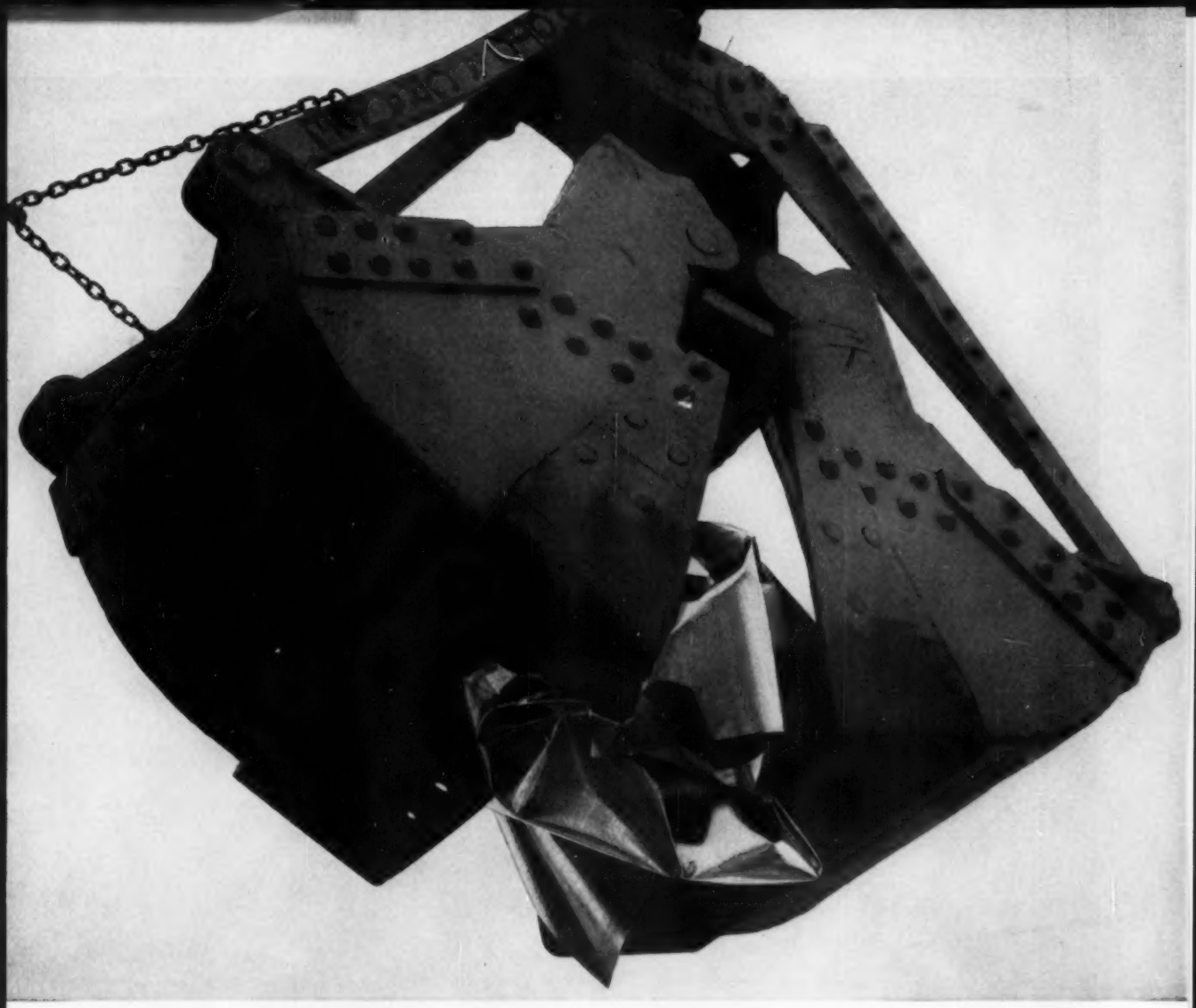
It will pay you to get further facts on this complete line of crucibles. For exact recommendations and all necessary details, contact your Norton Representative. Or write for new catalog, "*Norton Refractory Crucibles*," to NORTON COMPANY, 211 New Bond Street, Worcester 6, Mass.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

NORTON
REFRACTORIES
Engineered . . . R . . . Prescribed

Making better products . . . to make your products better

NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — BEHR-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



SQUEEZE PLAY FAILS TO SCORE AGAINST WEIRKOTE®

Crun-n-n-ch!

For brutal, iron-jawed pressure, a steam shovel has few equals. Here, in this crushing grip, Weirkote's zinc coating undergoes a murderous test.

Yet at every crease, at every tortured angle of this crumpled mass, the zinc remains an integral part of the steel. There is not one sign of flaking anywhere!

No wonder strenuous forming operations such as lock seaming are child's play, for Weirkote can be worked to the very limits of the steel itself!

No wonder parts fabricated from it require no painting, plating or redipping to guard against corrosion. Weirkote parts can be stamped, drawn or spun well in advance of use, and stored without danger of rust.

Why not find out what Weirkote's benefits can mean to you?

Free Weirkote Booklet! Send for all the facts on Weirkote. Write Weirton Steel Company, Dept. A-6, Weirton, West Virginia

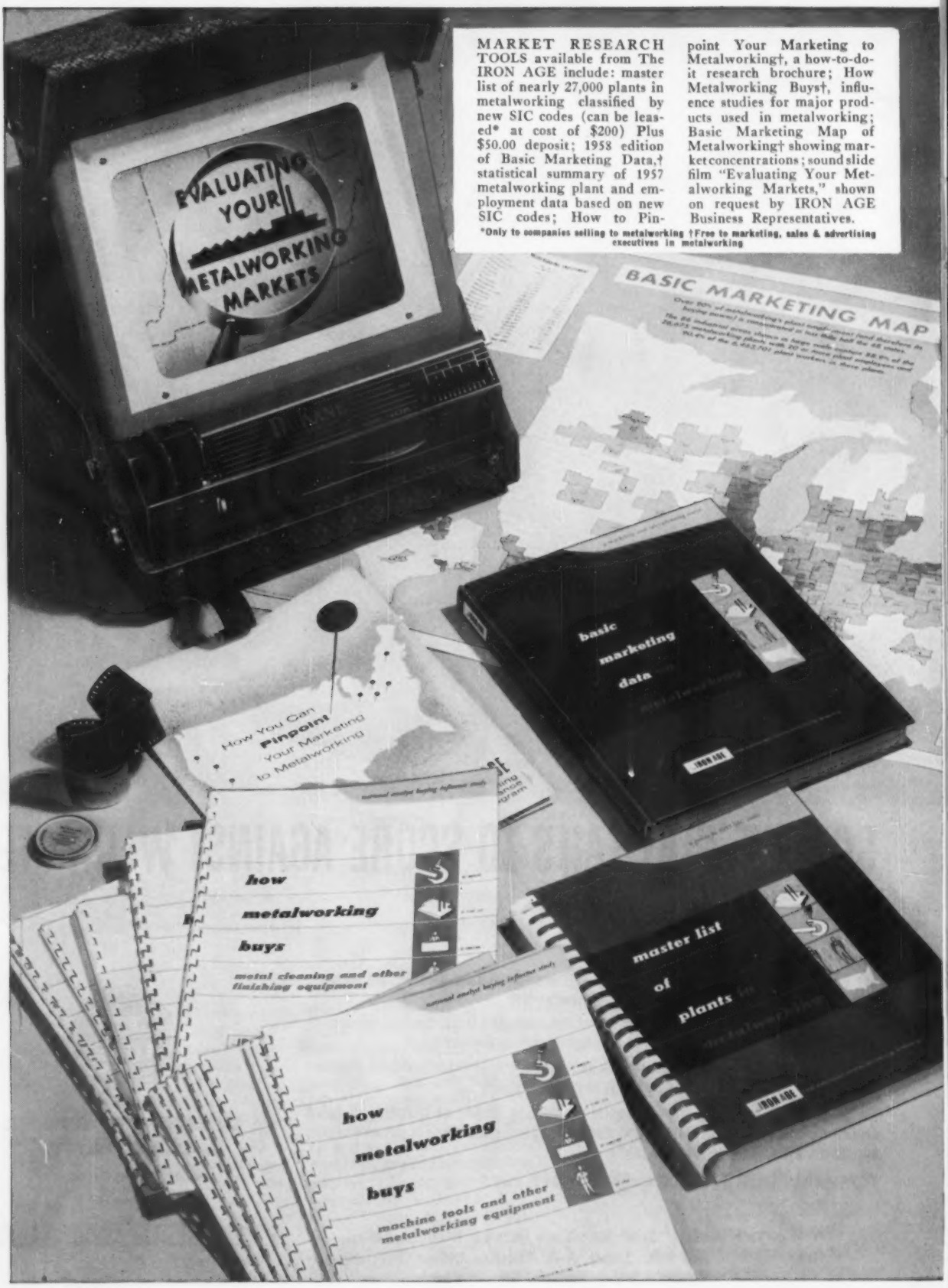
WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION


EVALUATING YOUR METALWORKING MARKETS
BASIC MARKETING MAP
basic marketing data
How You Can Pinpoint Your Marketing to Metalworking
how metalworking buys
metal cleaning and other finishing equipment
how metalworking buys
machine tools and other metalworking equipment
master list of plants

MARKET RESEARCH TOOLS available from The IRON AGE include: master list of nearly 27,000 plants in metalworking classified by new SIC codes (can be leased* at cost of $200) Plus $50.00 deposit; 1958 edition of Basic Marketing Data,† statistical summary of 1957 metalworking plant and employment data based on new SIC codes; How to Pinpoint Your Marketing to Metalworking†, a how-to-do-it research brochure; How Metalworking Buys†, influence studies for major products used in metalworking; Basic Marketing Map of Metalworking† showing market concentrations; sound slide film "Evaluating Your Metalworking Markets," shown on request by IRON AGE Business Representatives.

*Only to companies selling to metalworking †Free to marketing, sales & advertising executives in metalworking

How to Get More for Your Marketing Dollar in Metalworking

New IRON AGE Marketing Assistance Program Helps You Identify and Locate the Most Profitable Markets for Your Products

If you sell to metalworking, The IRON AGE Marketing Assistance Program can help streamline your marketing setup to meet today's intensified competition.

This program makes available research tools for carrying out four key steps to improved marketing. First, it provides a master list of metalworking plants, or an IRON AGE SIC coding service for classifying your customers and prospects by the new SIC codes, thus identifying the industries that make up your metalworking markets. Second, it provides statistical data for evaluating the sales potential of these industries for your product. Third, it summarizes metalworking plant and employment data, so you can pinpoint your major sales targets nationally, by states, and by convenient industrial areas within states. Fourth, it provides information that can increase sales efficiency by identifying the buying-influence executives you must *sell* by industry, plant size, title and function.

In short, using the tools of The IRON AGE Marketing Assistance Program, you can identify your markets more accurately, make sales planning more effective, and increase sales efficiency. The result is that you get more for your marketing dollar in metalworking.

Your IRON AGE representative has complete details on these research tools . . . and the basis on which they are available. He can also show you a new IA sound slidefilm, "Evaluating Your Metalworking Markets."

How to Get More for Your Marketing Dollar in Metalworking
SIC 3621
1.
Identify the industries that make up your markets
$
2.
Evaluate market potential of each industry
3.
Gear sales efforts to market potential
4.
Increase sales efficiency by preselling buying-specifying team

The **IRON AGE**

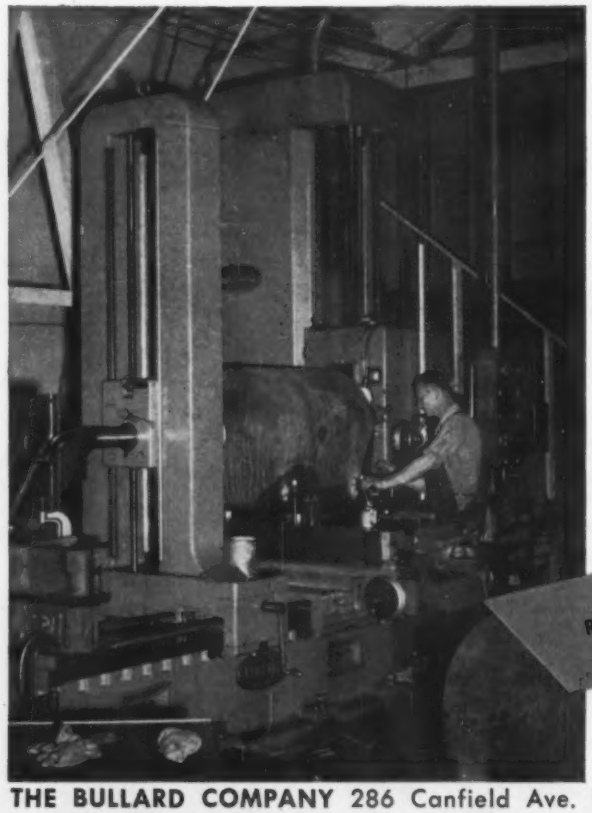
A Chilton Publication

Chestnut & 56th Sts., Philadelphia 39, Pa.

"To meet Today's and Tomorrow's Complex Machining Problems

we bought a . . . "BULLARD H.B.M. model 75

This statement by Mr. Reed Clark, General Manager, C. & H. Machine and Engineering Company, Berkeley, California summarizes, after thoroughly investigating and comparing competitive machines, their conclusion.

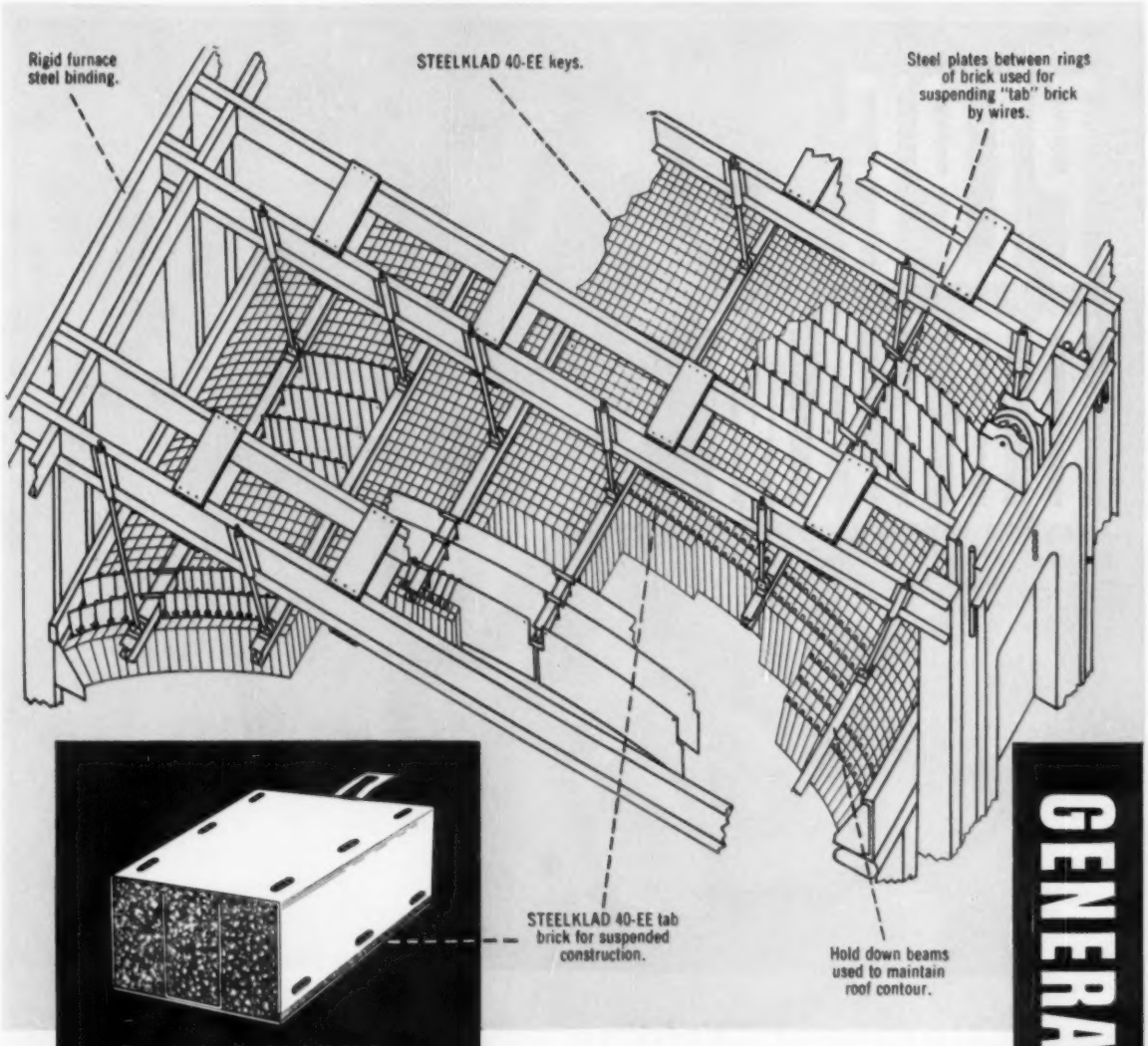


If you are planning to purchase a horizontal boring machine, we invite you to compare, feature for feature, the Bullard H.B.M., Model 75 with other machines in its field. You will discover that — "To Cut Costs When Cutting Metal — Buy Bullard" — is sound advice.

A call to your Bullard Sales Representative or Distributor will bring you the complete story.

BULLARD

THE BULLARD COMPANY 286 Canfield Ave. Bridgeport 9, Connecticut


Rigid furnace steel binding.
STEELKLAD 40-EE keys.
Steel plates between rings of brick used for suspending "tab" brick by wires.
STEELKLAD 40-EE tab brick for suspended construction.
Hold down beams used to maintain roof contour.

Cross section Steelklad 40-EE Brick

Breakthrough in Steelmaking...

Basic refractory brick—pioneered by Grefco—has produced a breakthrough in modern steelmaking. Previously, the advantages of greater steel production at lower cost, brought about by improved operating techniques and greater use of oxygen, were largely offset by the fact that conventional refractories could not withstand the far higher temperatures and stresses that resulted. Only "All-Basic" furnaces (i.e., furnaces completely lined with basic refractory brick) can endure these more punishing production schedules without costly shutdowns for repairs.

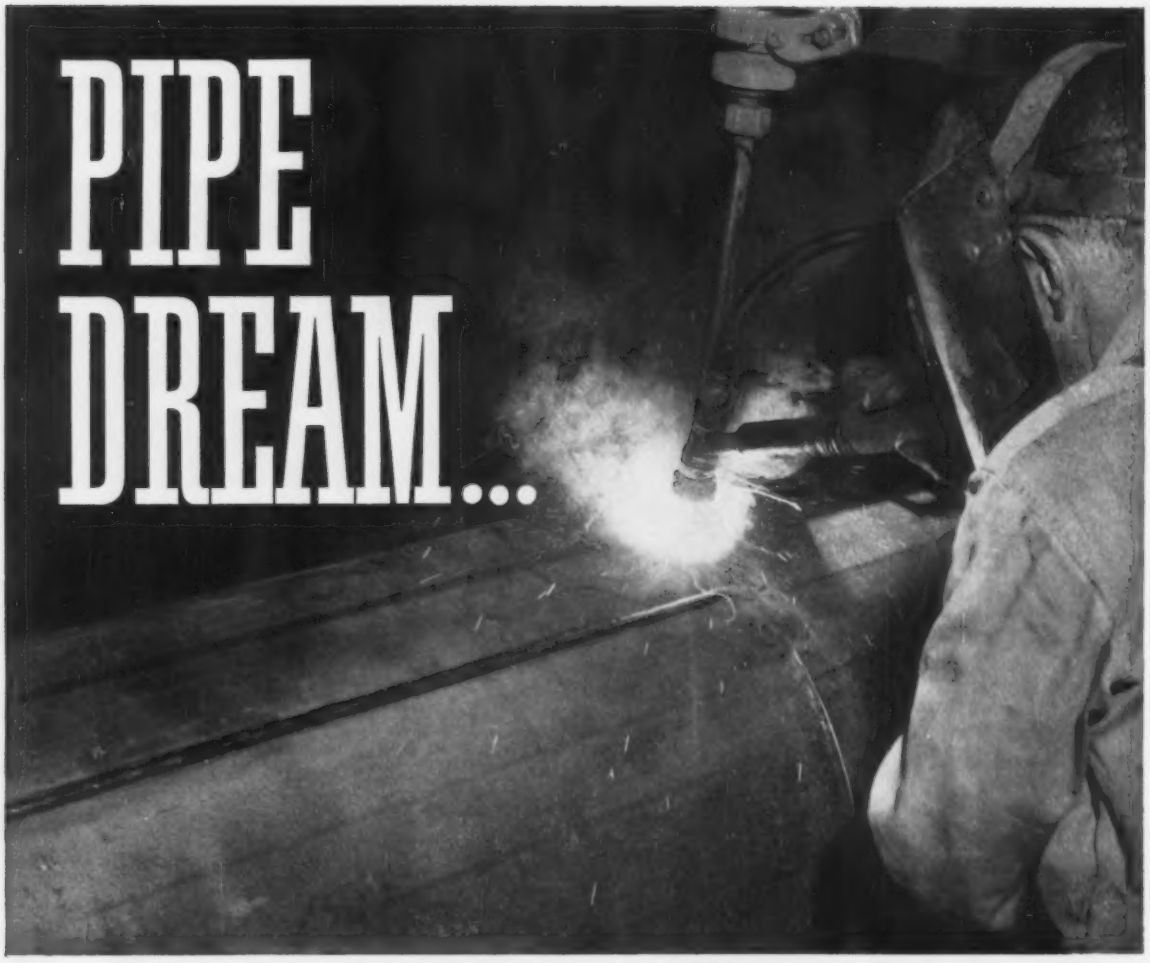
As a result, there are or soon will be in operation in North America more than 75 "All-Basic" furnaces with roofs of GREFCO "STEELKLAD 40-EE", the original internally-plated basic brick.

Grefco technical and sales service personnel will be glad to provide you with the basic brick exactly tailored to your needs, and with the know-how and experience that make Grefco the industry leader in basic refractories.

GENERAL REFRACTORIES COMPANY
Philadelphia 2, Pa.

A COMPLETE REFRACTORIES SERVICE

GENERAL REFRACTORIES



...UNIONARC Welding saves $7000 on one production run

UNIONARC Welding—LINDE's new electric welding method for steel—increased production by 300% and saved a western pipe mill $7000 on a single run of steel pipe. Replacing covered electrode methods, UNIONARC Welding is expected to save this company $150,000 a year.

UNIONARC Welding uses a continuously-fed wire electrode, magnetically coated with flux and shielded with carbon dioxide gas. It has three times the speed and weld penetration of covered electrode welding. And UNIONARC Welding gives you "finished", X-ray quality welds and low hydrogen deposits—in all welding positions.

See for yourself—ask your nearest LINDE representative to *prove* that UNIONARC Welding slashes time and labor costs over conventional methods. Call your local LINDE office today! Or write Box I-122. LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

Linde TRADE-MARK

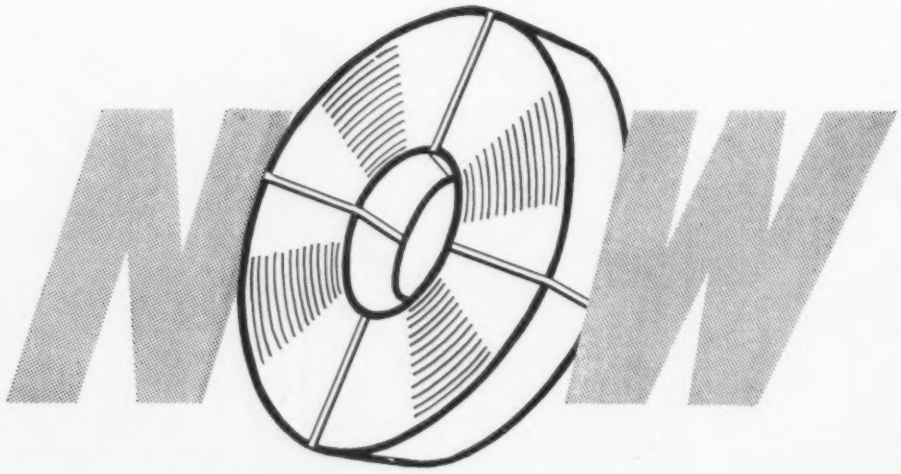
UNION CARBIDE

"Linde", "Unionarc", and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Once again...
a warm "good cheer"
for the
Brightest Season
of the Year

The special brightness of the holiday season is reflected in the shining faces of the many household servants made of Brass . . . honest, solid Brass that's a faithful lifelong friend on every job it's called upon to do . . . in a word, Brass that's made "Bristol-fashion." Prove it . . . *in your own product.*

The **BRISTOL BRASS** Corporation
Since 1850, makers of Brass strip, rod, and wire in
BRISTOL, CONNECTICUT



CHASE IS ROLLING SHEET ALUMINUM

. . . and Chase as your aluminum source gives you all these advantages!

LONG EXPERIENCE – For years Chase has been rolling aluminum for special applications, along with other metals, giving Chase unrivalled non-ferrous metals experience...82 years working with metals!

LATEST EQUIPMENT for quality production and exacting production techniques assure close tolerance controls required in narrow-width rolling of aluminum for use in fin stock, in deep drawing, and spinning and in eyelet parts.

HUGE STOCKS of semi-finished aluminum at Chase Cleveland and Waterbury mills assure you quick delivery of coiled sheet to meet your exact needs.

DEPENDABLE SUPPLY – because Chase can draw on unlimited stocks of raw metal.

* * *

Talk over your requirements with your Chase District Office, or write Chase, Waterbury 20, Connecticut.

From ½" to 18" width in 90 to 110 lb./inch coils

Mill Stocks of These 6 Alloys On Hand In Waterbury and Cleveland Mean Quick Service

1100	**3003**	**3004**
5005	**5050**	**5052**

Chase®

BRASS & COPPER CO.

WATERBURY 20, CONN.

Subsidiary of

Kennecott Copper Corporation

THE NATION'S HEADQUARTERS FOR **ALUMINUM • BRASS • BRONZE • COPPER • STAINLESS STEEL**

Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles Milwaukee Minneapolis Newark New Orleans New York (Maspeth, L. I.) Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

Tolerances .0002 with Cities Service Cutting Oil!

If you think the days of the precise craftsman are a thing of the past, you ought to take a tour through Arch Gear Works at North Quincy, Massachusetts.

There, you'd see some of the nation's foremost specialists in precision gearing going about their jobs with the most painstaking accuracy.

Such accuracy is absolutely vital at Arch Gear Works, because this unusual firm produces amazingly intricate mechanisms involving as many as 50 tiny precision gears... gears that automatically control the speed and torque of sensitive electro-mechanical devices.

In this highly complex, precise operation, Cities Service is the choice of cutting oils for a very simple reason: Cities Service Cutting Oils deliver .0002 tolerances and the finest possible finish. Few oils can match this performance.

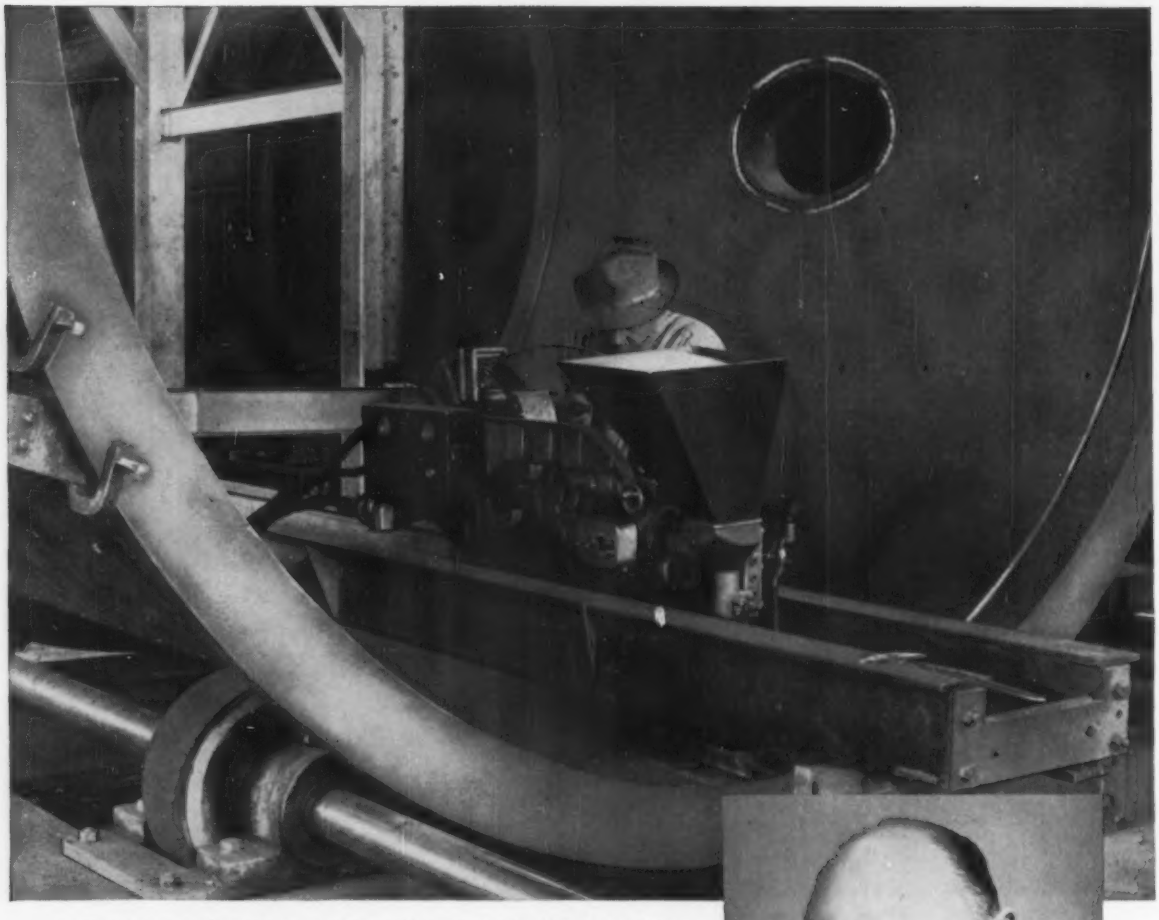
With equally outstanding results, Arch Gear Works uses Cities Service Anti-Corrode to protect its gears during shipment, and Cities Service Pacemaker Oils for general lubrication and hydraulic machinery.

But you needn't operate a gear works to prove that Cities Service lubricants are geared to *your* operation. Simply talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N.Y.

Specialist Assembles Tiny Gear. Some mechanisms contain as many as 50 tiny precision gears—all produced with the aid of Cities Service Cutting Oils—and protected during shipment by Cities Service Anti-Corrode.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



Many of Mine and Smelter's Marcy grinding mills are equipped with Standard Steel flange rings, shown above. No flange ring replacements have ever been required. Some of these mills have been operating 24 hours a day for more than 15 years.

"'Dependability' is the keyword in our very fine relationship with Standard Steel"

We at Standard are happy indeed that Mine & Smelter Supply Co.'s chief engineer, J. R. Grout, appreciates the efforts we have gone to over the years to combine dependable service with our know-how and quality standards.

We consider it our responsibility to help maintain the world-wide reputation for quality mining and industrial equipment which Mine & Smelter Co.'s Marcy Mill Division enjoys by providing this customer with the same fine service it renders, in turn, to *its* customers.

Won't you discuss your needs for weldless rings, flanges, forgings and castings with us. You will appreciate our personalized service. Write Dept. 1-M.

"Standard Steel for many years has been supplying our company with shell flange rings, as well as riding and roller tires for use on our Marcy Grinding Mills and other rotary-type equipment. Their product quality and cooperation have helped make it possible for us to serve our customers promptly—our company policy. I believe the word 'dependability' is the keyword in our very fine relationship with Standard Steel," says Joseph R. Grout, chief engineer, Marcy Mill Division, Mine & Smelter Supply Co.

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

YEARS OF PROFITABLE PRODUCTION

BUILT INTO

"BUFFALO"

NO. 18 DRILLING MACHINES

These drills are constructed to provide the longest possible useful life and the utmost accuracy in operation. Easy to set up and operate, the rugged, dependable No. 18 is designed to cut production costs in a wide variety of operations.

Quality Features of the "Buffalo" No. 18 Drill:

- **SPINDLE** — Multiple-splined alloy steel, ground, polished and carefully balanced. Rotates in two precision-type ball bearings, designed to take the thrust of heavy-duty operations. Design of spindle pulley bearings prevents torque being transmitted directly to spindle.
- **FRAME** — Large, heavy head frame insures accuracy throughout life of machine.
- **TABLES AND BASES** — Built to extra-heavy proportions, with large working surfaces.
- **RAISING SCREW** — Full ball bearing construction, actuated by machine-cut steel screw and gears. Three ball thrust bearings provide easy operation.
- **FOOT FEED** — Operated by a gear meshing the feed pinion. Foot treadle return by torsion spring, giving maximum return pressure at end of stroke.

For capacities up to 1" in cast iron, the "Buffalo" No. 18 Drill is your best buy. Available in floor and bench models — bench types up to 6 spindles.

Contact your "Buffalo" machine tool dealer for full information on the No. 18 Drill, or write us direct for Bulletin 3123-E.

Every "Buffalo" Machine Tool brings you the exclusive "Q" Factor—the built-in QUALITY which provides trouble-free satisfaction and long life.

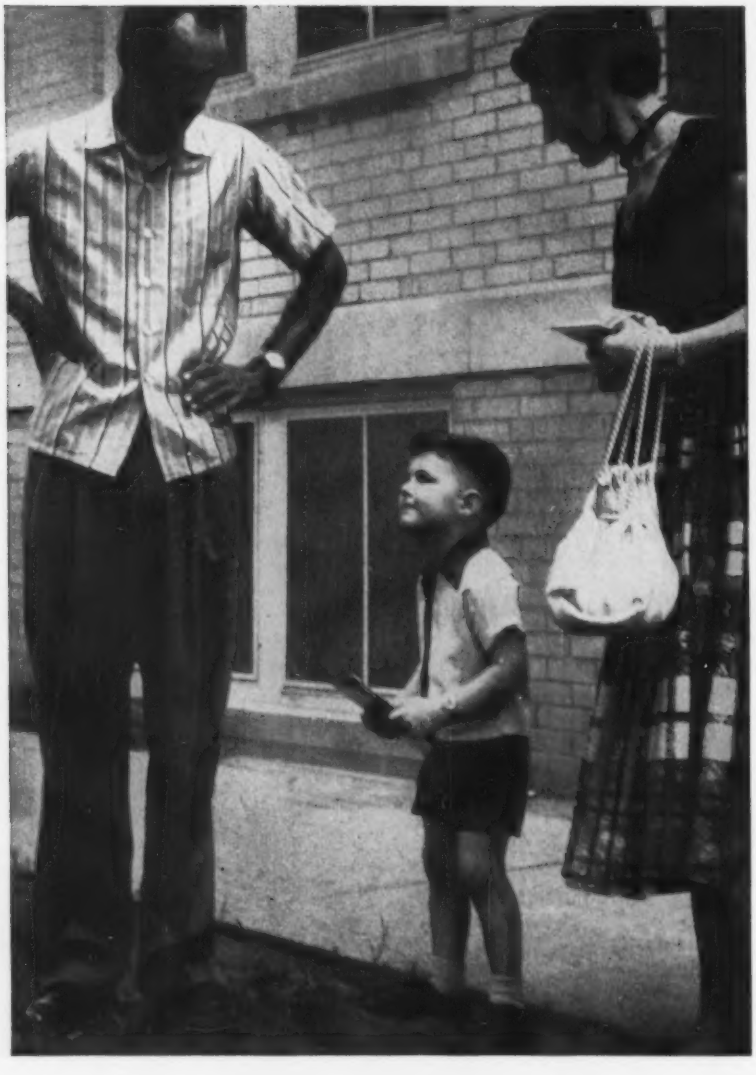
ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY

492 BROADWAY • BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING



"AM I GOING HOME?"

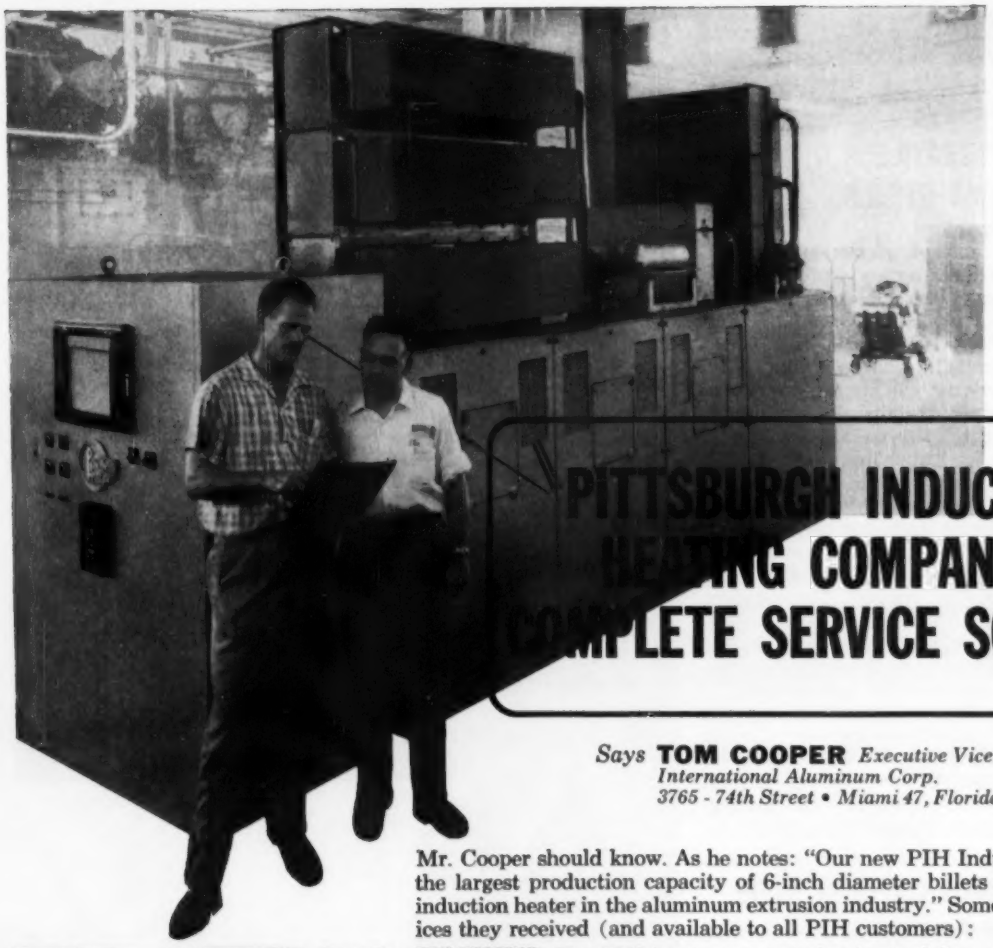
This is an actual photograph of a boy with pulmonary tuberculosis.

Years ago he might *not* have gone home, ever! But thanks to today's modern methods, his case was diagnosed early—and after only a few months of treatment, he was released from the hospital.

Your purchase of Christmas Seals helps to make true stories like this possible—through continually improved TB *diagnosis, research,* and *patient rehabilitation.* Send your contribution today, please. ***Buy and use Christmas Seals.***

This space contributed to the National Tuberculosis Association and its affiliates by

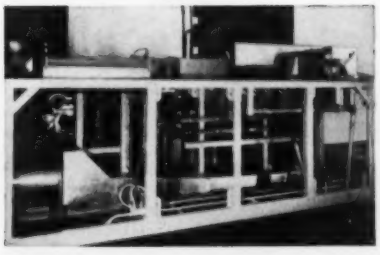
The IRON AGE



PITTSBURGH INDUCTION HEATING COMPANY'S COMPLETE SERVICE SOLD ME

Says **TOM COOPER** *Executive Vice President*
International Aluminum Corp.
3765 - 74th Street • Miami 47, Florida

Mr. Cooper should know. As he notes: "Our new PIH Induction Heater has the largest production capacity of 6-inch diameter billets of any single-coil induction heater in the aluminum extrusion industry." Some of the extra services they received (and available to all PIH customers):



PRE-TESTING: The PIH heater was tested prior to delivery. Mr. Cooper was invited to witness this test, in which International Aluminum billets were heated at actual plant production rates. The tests covered charging and discharging mechanism, control circuits, power circuits, billet temperature instruments and all safety devices. Mr. Cooper says: "This testing saved us time and money and assured us of a furnace ready to do the job when it was installed."

INSTALLATION: PIH Engineers visited the actual site at International Aluminum Corp., and supervised all work from installation to the beginning of production.

EVERY PITTSBURGH INDUCTION HEATING
installation is backed by these outstanding features...

- **Heavy-duty Construction**
- **One-Year Warranty**
- **Maximum Safety**
- **Labor and Space Savings**
- **Greater Margin of Profit**

PIH heaters have a wide range of ferrous and non-ferrous applications, can cut your costs and operating time, increase profits. Consult a PIH Engineer, learn the advantages of induction heating for optimum heating of all metals for extrusion, forging, rolling, annealing and other purposes.

Send for detailed brochure with frequency graph on Induction Heating.

PIH

Pittsburgh Induction Heating Company Incorporated

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STANDARDIZE WITH VERSATILE AMBALLOY STEELS

There are a lot of reasons for standardizing with Amballoy—personalized steels from Byers. The most important is that you *save money*.

Here's how. First: the very versatility of Amballoy enables you to reduce your necessary chemistries to one or two. Second: through heat treating, you can match this metal to your most exacting physical characteristics.

It's an ideal way to increase your "internal revenue." Metal-users who standardize on Amballoy shrink unproductive capital. Their inventories and special handling and processing costs are drastically reduced. There's more to the story. And the Byers metallurgist has it. Let him show you how Amballoy steels can qualify as the workhorse material for your critical applications.

For further information and the name of your Steel Service Center stocking Amballoy, write or call: Manager of Steel Sales, ATlantic 1-8110, A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

SAVE THROUGH YOUR STEEL SERVICE CENTER

The savings are very real.

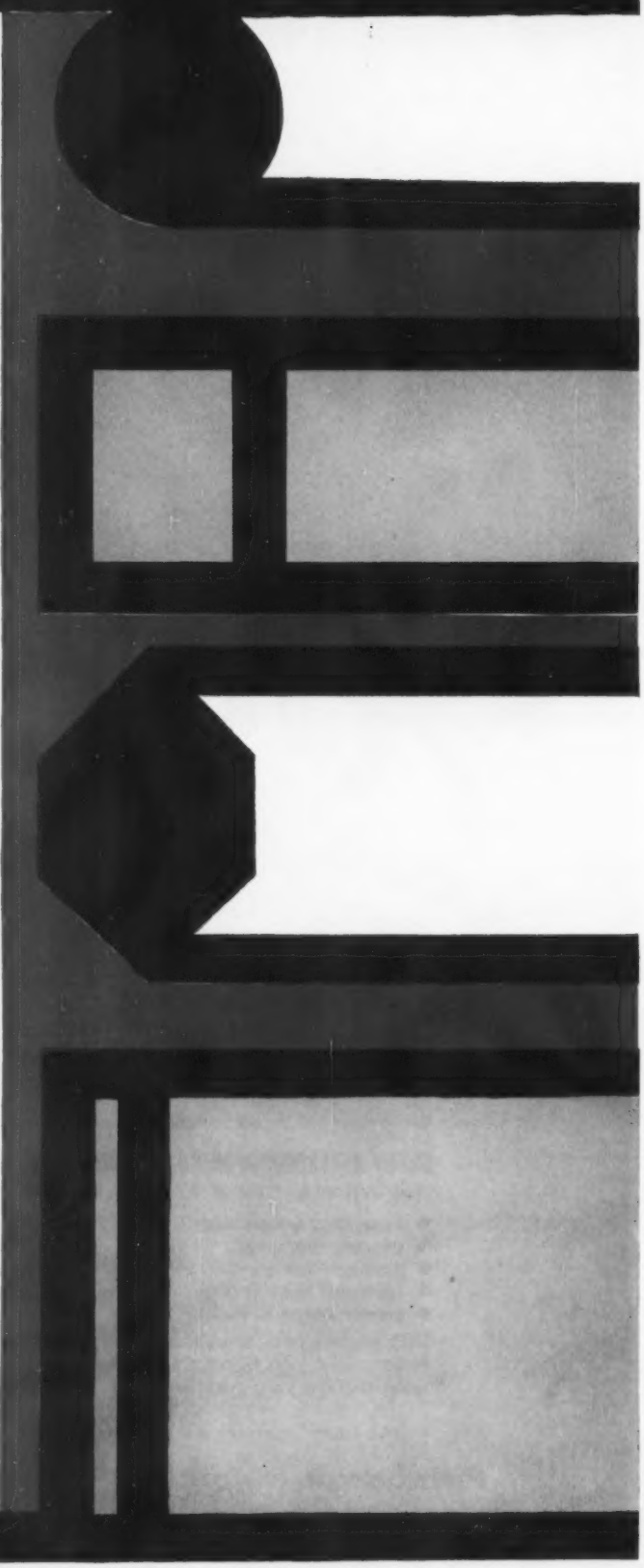
Your Steel Service Center is manned, equipped, stocked and located to serve you metal-users at a fraction of what it would cost you to serve yourselves. Consider the advantages, the savings in letting your Steel Service Center distributor carry the vast inventory. Let him meet those 24-hour commitments. Let him do the slitting, flame-cutting, sawing, shearing. Let him pay for the space and manpower to do it.

That's his business. He's an old pro at it. So let him roll with the market's uncertainty. Let his capital, his equipment, his record-keeping assume the brunt of today's high operating costs. Let him process your order for Amballoy steels.

And when you need help in standardizing on the *right* alloys for your requirements, write or call *us*: ATlantic 1-8110, A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

A. M. BYERS COMPANY

AMBALLOY ELECTRIC FURNACE QUALITY STEELS

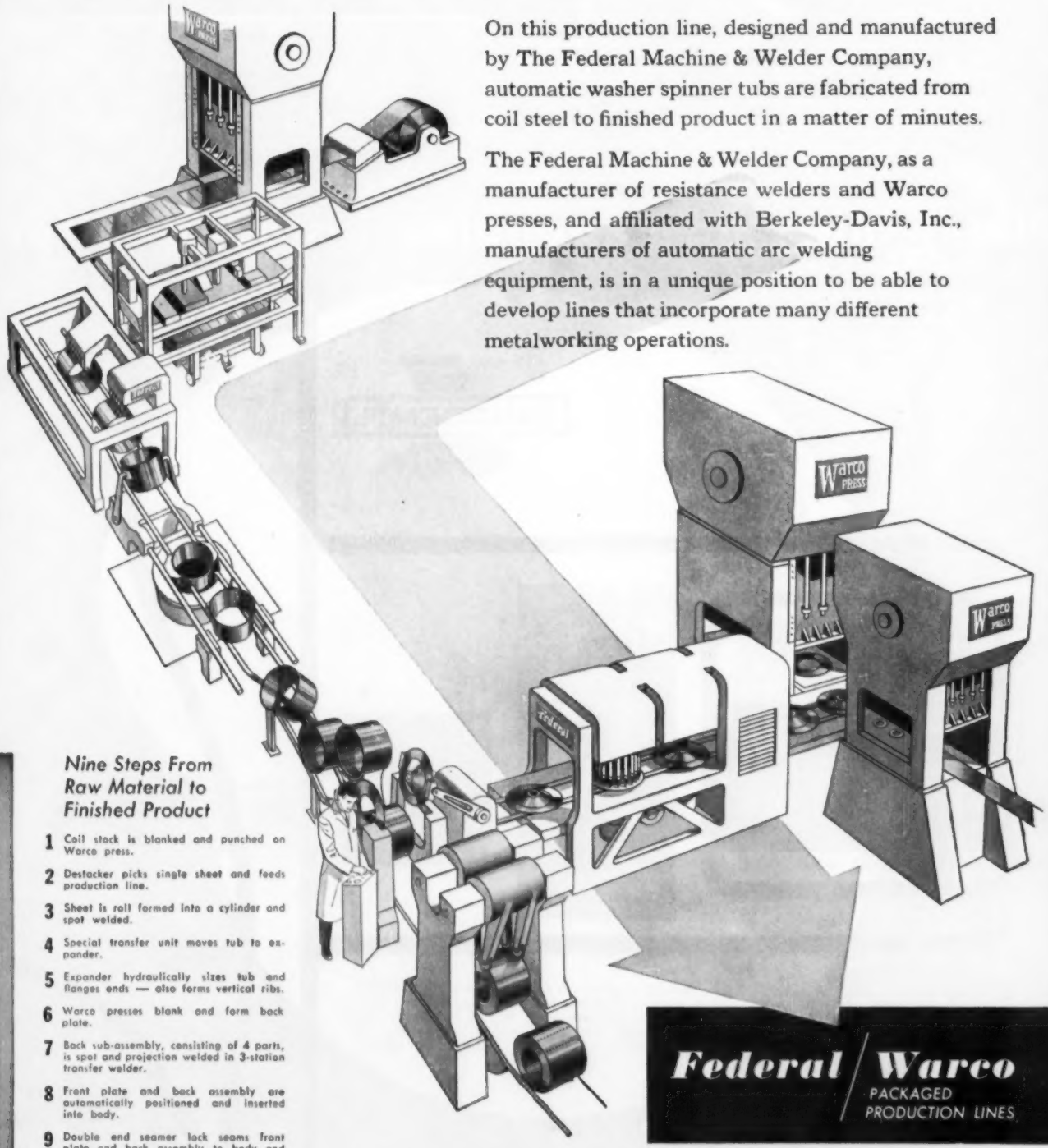


THE ACCENT IS ON PRODUCTION

in a production line by FEDERAL

On this production line, designed and manufactured by The Federal Machine & Welder Company, automatic washer spinner tubs are fabricated from coil steel to finished product in a matter of minutes.

The Federal Machine & Welder Company, as a manufacturer of resistance welders and Warco presses, and affiliated with Berkeley-Davis, Inc., manufacturers of automatic arc welding equipment, is in a unique position to be able to develop lines that incorporate many different metalworking operations.



Nine Steps From Raw Material to Finished Product

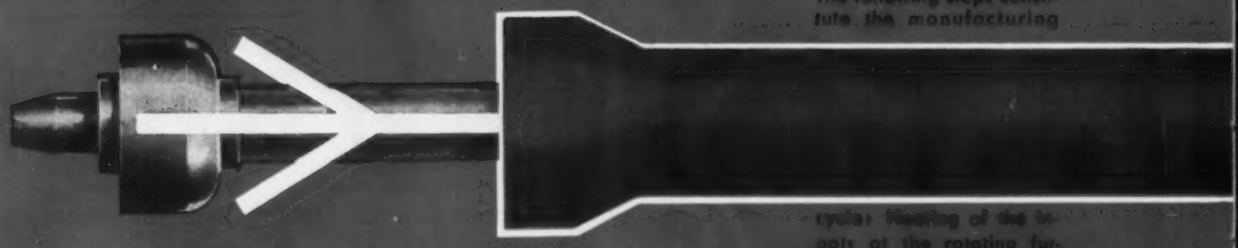
1. Coil stock is blanked and punched on Warco press.
2. Destacker picks single sheet and feeds production line.
3. Sheet is roll formed into a cylinder and spot welded.
4. Special transfer unit moves tub to expander.
5. Expander hydraulically sizes tub and flanges ends — also forms vertical ribs.
6. Warco presses blank and form back plate.
7. Back sub-assembly, consisting of 4 parts, is spot and projection welded in 3-station transfer welder.
8. Front plate and back assembly are automatically positioned and inserted into body.
9. Double end seamer lock seams front plate and back assembly to body and ejects finished tub.

* Sequence of operations controlled by static relay system designed and built by Federal.

Federal / Warco PACKAGED PRODUCTION LINES

THE FEDERAL MACHINE AND WELDER COMPANY, WARREN, OHIO

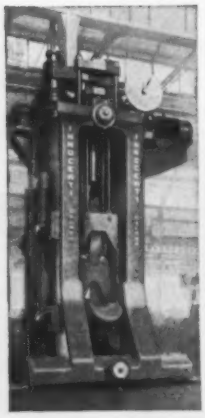
Affiliated with Berkeley-Davis, Inc., Danville, Illinois



The "INNOCENTI-Calmes" pilger mill is suitable to manufacture seamless pipes up to an 18" diameter. The following steps constitute the manufacturing cycle: heating of the ingots at the rotating furnace, piercing at piercing press (1) and preliminary rolling at the elongator-equalizer mill (2) in order to center the hole of the ingot and to improve the metallurgical qualities of the steel. The final rolling at the pilger mill (3) (4) (5) is obtained by forging and

Pilger mill and expanding installation for

INNOCENTI



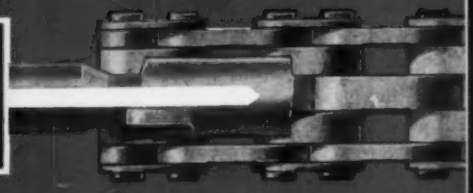
3

5

works in milan

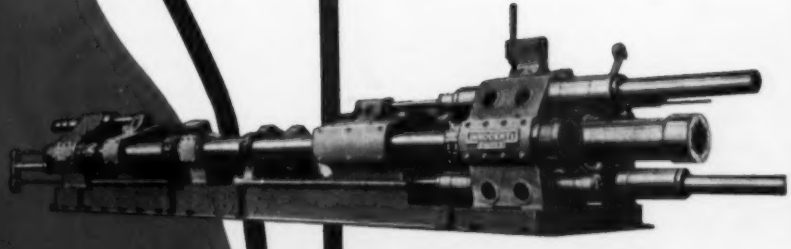
bertoni e.2.69

makes possible a very high yield of finished pipes in commercial sizes. The quality of the finished pipes is very high although ordinary ingots which are low cost raw material, are used. With an initial low investment and normal operating cost the pipe expanding equipment designed and manufactured by Innocenti is suitable to expand pipes up to 24" diameter, practically covering the entire range of commercial sizes.



extra large diameter seamless steel pipes.

INNOCENTI

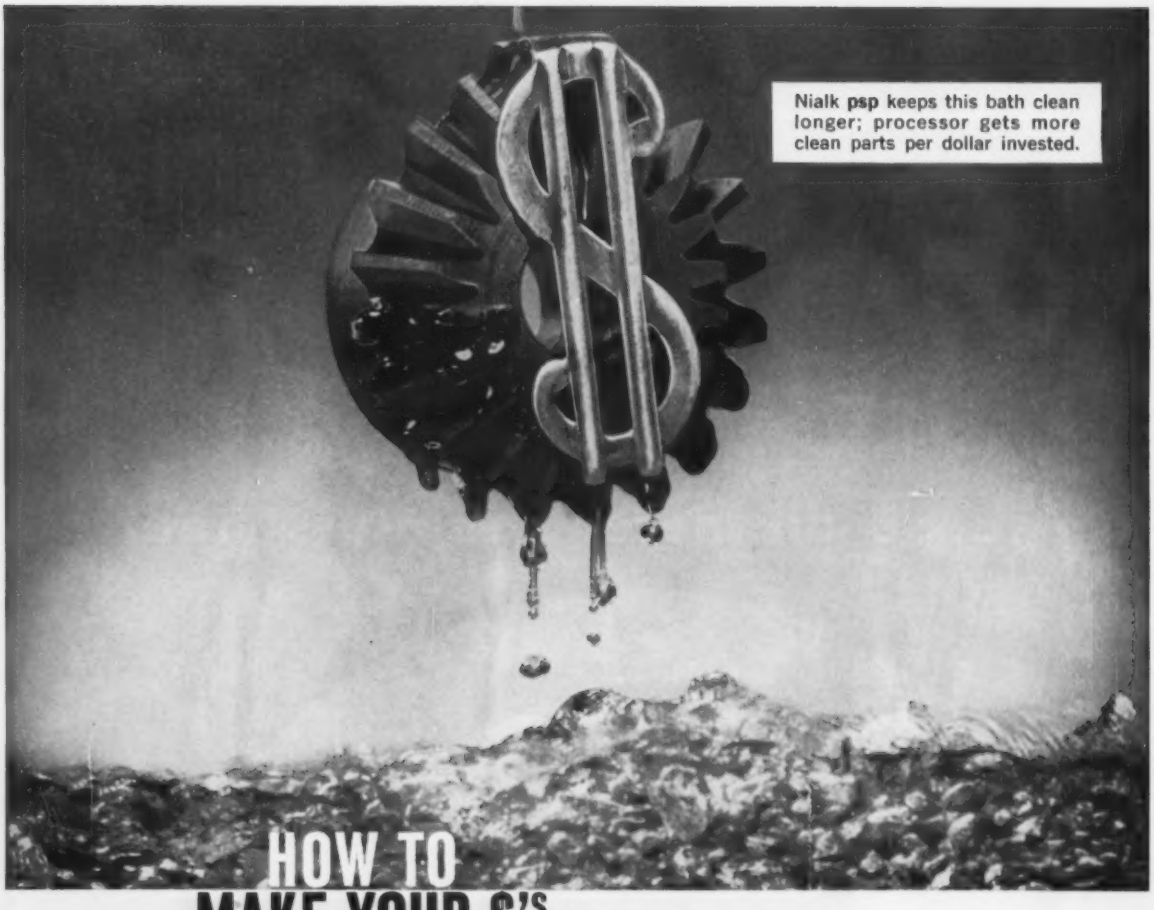


1

2

Innocenti mills are suitable for producing all types of pipes from standard gas pipes to the special A.P.I. pipes. Pilger mill and special mill for mass production of small pipes (push-bench and continuous mill) have been designed by Innocenti and installed throughout the world.

(italy)



HOW TO MAKE YOUR $'S DEGREASE MORE PARTS

You make no profit on the time you spend cleaning out a degreaser.

You cut another slice off the top of profits whenever you have to add fresh stabilizer to your trichlorethylene bath.

When a bath goes "sour" while you're processing, you lose still more time and money.

psp is the simple answer

Trichlor is trichlor the world over; it's the *stabilizer* in your trichlor that can make the difference.

The difference in Nialk® stabilizer is *psp*—permanent staying power.

Nialk stabilizer is neutral. It cannot react with acids to form corrosive salts. Still it "accepts" acids and renders them completely harmless. The Nialk stabilizer will not stain or discolor your parts or allow your bath to become "sour."

You never add fresh stabilizer to a Nialk bath. The stabilizer stays potent no matter how long you use it. It's insoluble in water so you don't lose it during steam distillation or in the water separator of your degreaser.

Nialk frees your bath of those degradation products which settle on coils and cut down heat transfer. Clean-outs are widely spaced and quickly finished.

If your profit picture could use a little brightening, you'll want to know more about the whole subject of trichlor stabilizers. Send for our Bulletin 70 for the complete story.

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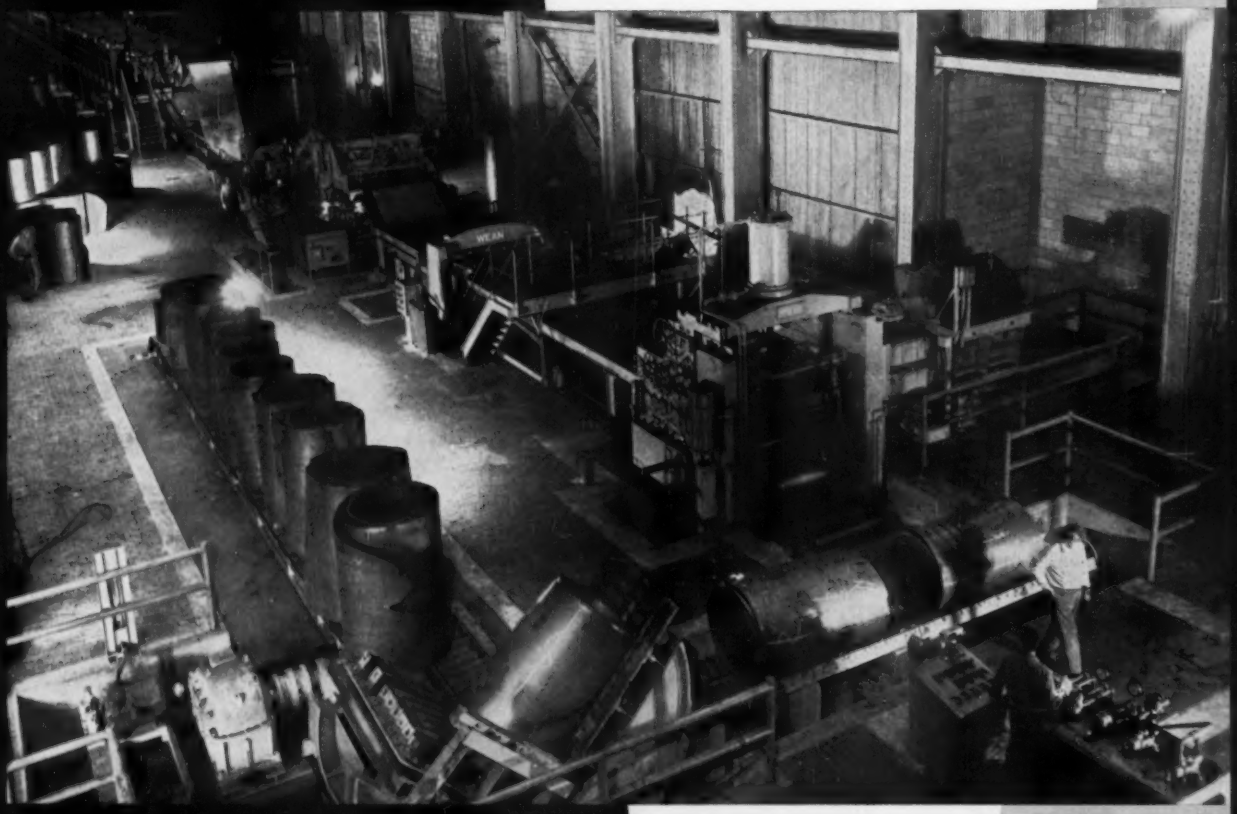
HOW WEAN

CREATIVE ENGINEERING

improves continuous Strip Pickling

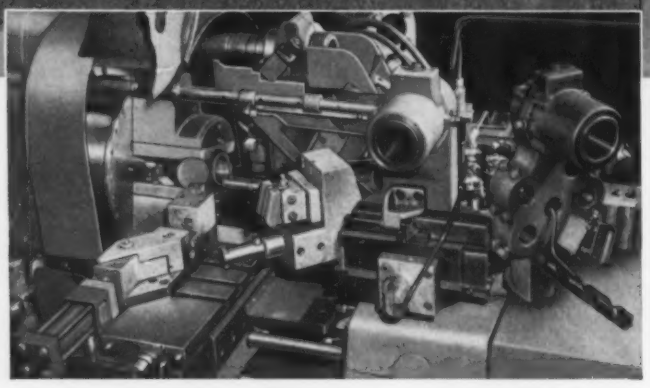


FASTER, more uniform pickling at reduced costs — that's why leading steel producers prefer Wean Continuous Strip Pickling Lines. From the McKay Processing Uncoiler to recoiling, the Wean line is engineered to deliver highest quality at greatest speed.

162

WEAN

THE WEAN ENGINEERING COMPANY INC., WARREN, OHIO



Edward Valves Div. cuts setup time on valve bodies

Takes advantage of electric setup control panel, octagonal turret, JETracer on Gisholt Fastermatic

You may spot production ideas in the way Edward Valves Division of Rockwell Manufacturing Company, East Chicago, Indiana, is increasing production of 1½" steel Univalve bodies.

A new Gisholt MASTERLINE 2F Fastermatic Automatic Turret Lathe is doing the job. With the Fastermatic's electric setup control panel, the operator preselects all important machine functions—including low spindle speeds for forming and threading, and high speeds for other operations. And with the Gisholt JETracer slide tool mounted on an 8-sided turret, a maximum number of surfaces are machined in a single chucking—with greater accuracy, finer finish and with more consistent quality.

Parts are held in an 18" 2-jaw hydraulically operated chuck. Automatic positioning at the end of each cycle speeds loading and unloading. Once the automatic cycle starts, turret tools drill, turn, face, form, relieve, chamfer, bore and thread. Cross slide tools face and chamfer. Critical internal diameters are finished to a high degree of accuracy, using turret-mounted JETracer slide tool.

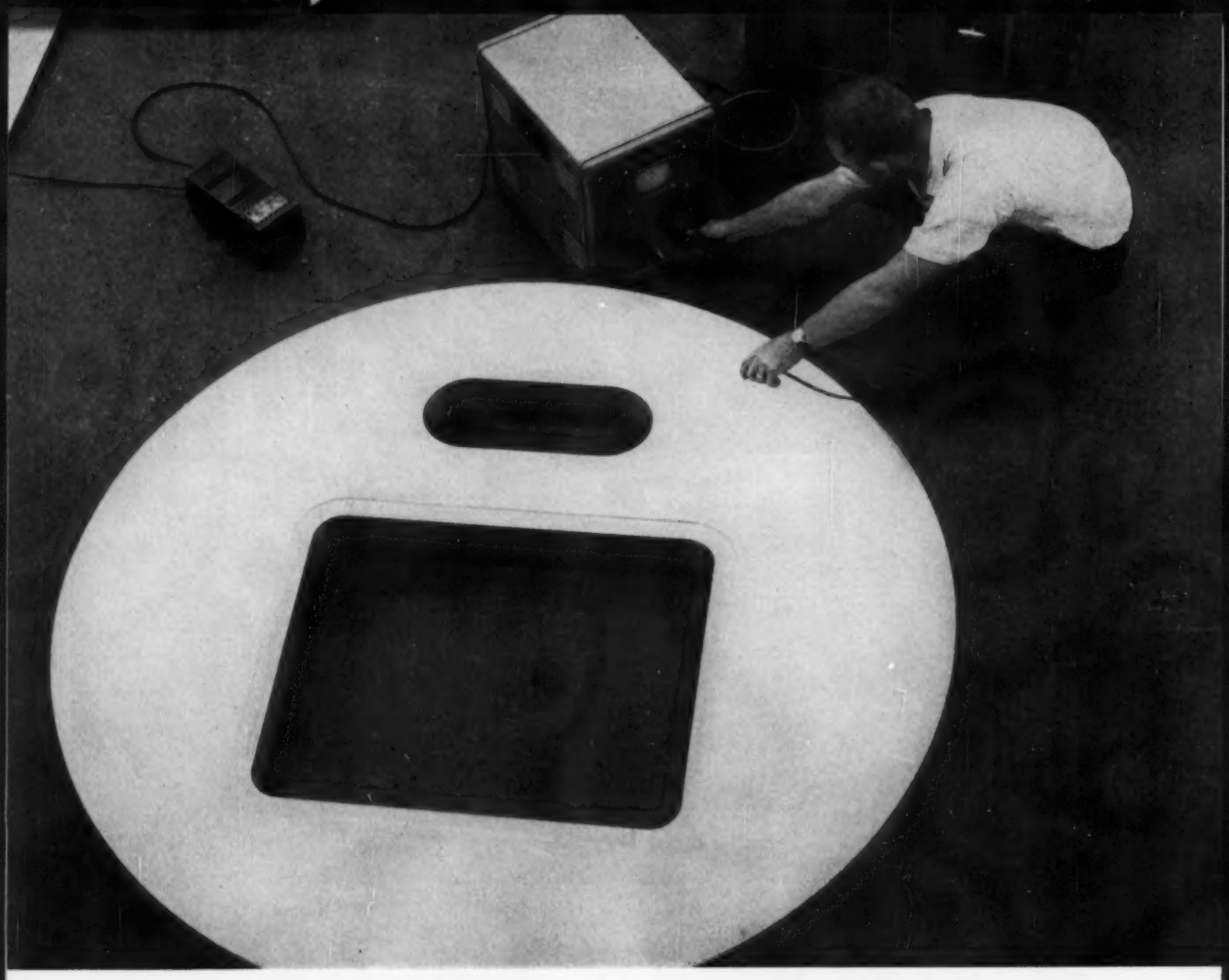
Like to hear the facts on how the Fastermatic lets you utilize smart tooling...eliminate human errors...get record production on long runs, automatic cycle operating advantages on short runs? Contact your Gisholt Representative. He has the facts, and his wide experience may suggest new methods to improve your profit picture.

MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

WRITE GISHOLT TODAY for advance data on the new Gisholt MASTERLINE Fastermatic Automatic Turret Lathe. Ask for Bulletin No. 1179.

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY REBUILT MACHINES WITH NEW MACHINE GUARANTEE



"test soundings"

. . . prove the soundness of Carlson stainless steel plate

"HEAVING THE LEAD" may be the traditional way to keep a boat off the shoals, but modern sound wave instruments do it faster and better. And, for a very different reason, modern sound wave devices are used to assure quality stainless steels. Carlson was one of the first producers to use ultra-sonic equipment for testing heavy gauge stainless plate.

In ultra-sonic testing, sound waves take a penetrating look inside and positively determine structural quality. A complete report on the results of the test is supplied to the customer. By specifying ultra-sonic tested plate, builders of aircraft components and nuclear equipment can tell in advance that the material will meet their rigid requirements.

Ultra-sonic is only one of the many tests used to maintain the high quality of Carlson stainless plate. The final, and most important test, is when *you* get repeat orders from *your* customers.

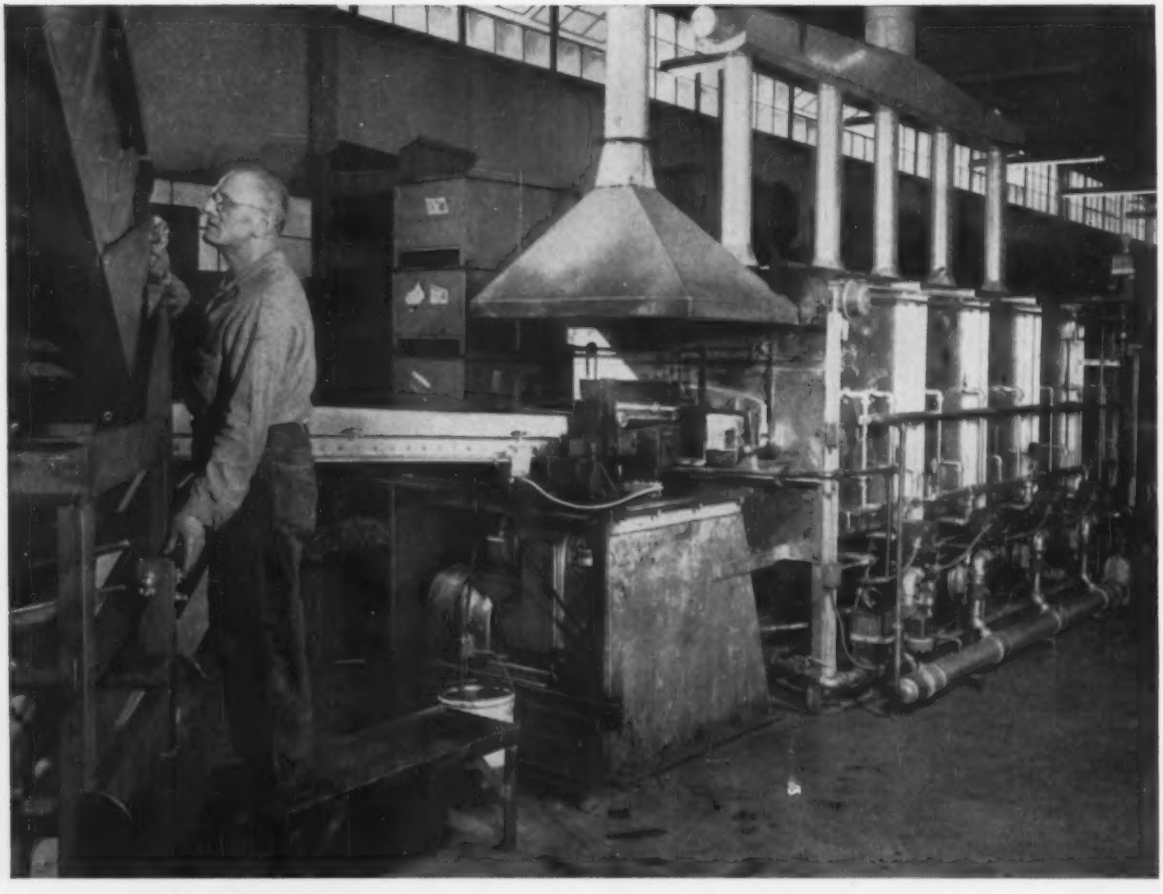
Write, wire or phone for complete information on all Carlson services.

G.O.CARLSON *Inc.*

Stainless Steels Exclusively

120 Marshalton Road
THORNDALE, PENNSYLVANIA
District Sales Offices in Principal Cities

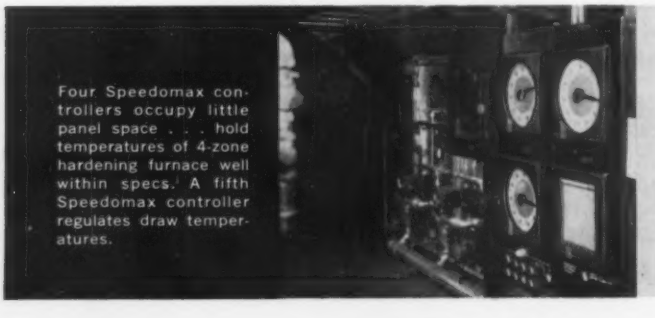
PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES • FLANGES • FORGINGS • BARS AND SHEETS (No. 1 Finish)



Lamson & Sessions Co.: Operator checks loading of furnace used to harden bolts made of 1038, 1335 and 4140 steel.

Reproducibility of hardening temperatures a problem?

Not at Lamson & Sessions Co.'s Chicago plant, where Speedomax® H controllers are helping to assure reproducibility of hardening specs for nuts and bolts. With competition keen, dependability and reproducibility of processing equipment is a "must". Since installation nearly two years ago, Speedomax H has been controlling temperature of hardening and draw furnaces 5 days/wk, 24 hrs/day. Weekends, furnaces idle at control temperature. Maintenance has been negligible . . . temperature always within specs. Rugged, compact and completely reliable, Speedomax H is providing the same dependable control on numerous heat treat operations . . . is helping produce both process economies and a quality product. *Whatever your heat treating process, it'll pay you to investigate Speedomax H!* For details, contact your nearest L&N office or write 4956 Stenton Ave., Phila. 44, Pa.

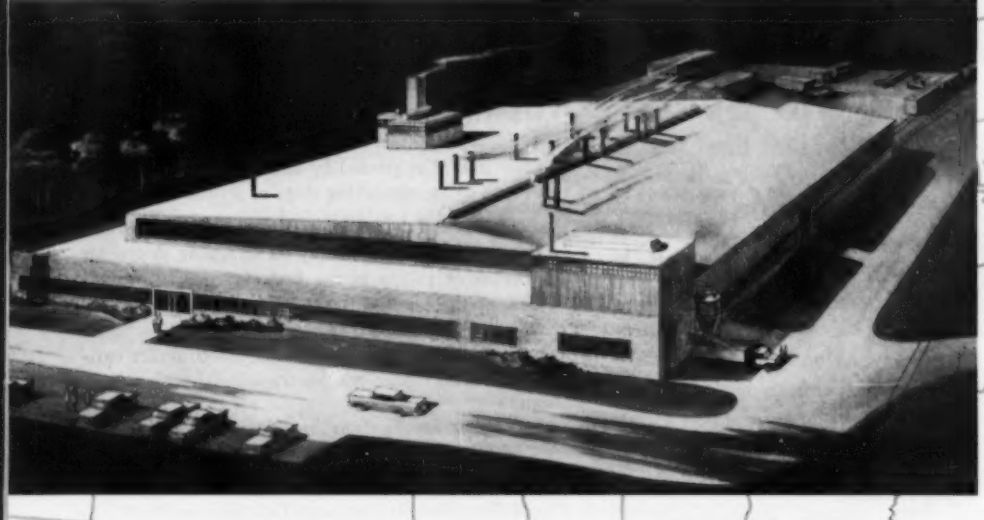


Four Speedomax controllers occupy little panel space . . . hold temperatures of 4-zone hardening furnace well within specs. A fifth Speedomax controller regulates draw temperatures.

LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces

Now producing . . . Federated quality aluminum casting alloys from the world's most modern aluminum smelter. New convenience, faster service from the new Alton, Illinois plant and the same rigid quality controls that distinguish all Federated products. This modern smelter can produce every specification of aluminum alloy. And Federated field metallurgists back up every shipment of Alton aluminum ingot with on-the-spot assistance based on long experience. For a broad choice of aluminum casting alloys, call your nearest Federated sales office. There are 23 of them to serve you promptly. Federated Metals Division, 120 Broadway, New York 5. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

FEDERATED METALS DIVISION OF



ASARCO

AMERICAN SMELTING AND REFINING COMPANY

2 to 3 times
Greater Thrust Capacity

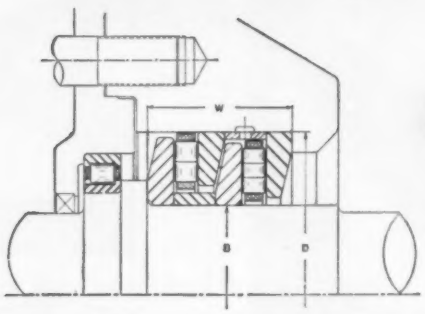
8 to 12 times
Longer Life Expectancy

New ROLLWAY
TANDEM THRUST BEARING

Using axial space along the shaft, rather than enlarging the housing diameter, this new Rollway tandem thrust bearing distributes the load over two or three stages of roller components. Gives 2 to 3 times more thrust capacity than conventional thrust bearings. Life expectancy is 8 to 12 times longer depending upon the number of stages.

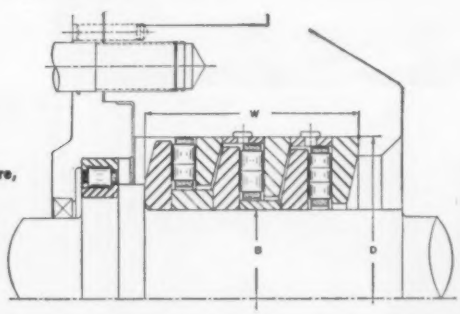
Each stage comprises a rotatable bearing plate . . . a bronze retainer with thru-hardened steel rollers . . . a compression sleeve . . . and a stationary bearing plate. The thrust load is applied to the first stage and is by-passed by each compression sleeve in turn to the remaining stage or stages.

Calculated deformation of the bearing plates distributes the load uniformly on all rollers. A greater number of rollers in the first stage carries about 60% of the load, without increasing the load per roller. Compression sleeves have cross-sectional areas proportional to the load imposed. Roller variance is held within one ten-thousandth inch.



✓ **TWO STAGE TANDEM**

22 sizes, up to 17" bore, 34" O.D., and 2,325,000 lb. capacity at 100 rpm



✓ **THREE STAGE TANDEM**

5 sizes, up to 17" bore, 34" O.D., and 3,410,000 lb. capacity at 100 rpm

Tandem Thrust Bearing manufactured by Rollway Bearing Company, Inc. under U.S. Patent Number 2,374,820.

Complete Specifications on Rollway Tandem Thrust Bearings, as well as other up-to-date information on bearing design is yours for the asking. See your Rollway engineer, or write: Rollway Bearing Company, Inc., Syracuse, N. Y.

ROLLWAY®
BEARINGS
COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

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Stainless Steel spinning information:

*Before you take a spin—check the oil

Stainless Steels lend themselves readily to cold spinning. When you spin Stainless Steel, be especially generous with the lubricant. Use lubricants with sufficient body to withstand the high pressures and temperatures that may develop. Because of Stainless Steel's superior toughness, greater pressure is required than that used for carbon steel. A good spinning tool is made of hardened alloy steel. It should have a large bearing surface to distribute the pressure as widely as possible.

Spinning Stainless Steel will give you accurate and uniform wall thickness in one operation not readily obtainable in drawing. Certain shapes can be spun more economically than drawn, which may require several operations and heat treatment. Remember, too, that certain types of steel are more adaptable to spinning than drawing.

You'll find that Stainless Steel isn't difficult to spin, it's just different. You can do a top-notch job with ease when you follow our 130-page manual. If you haven't received your free copy, write on your company letterhead for our "Stainless Steel Fabrication Book," United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

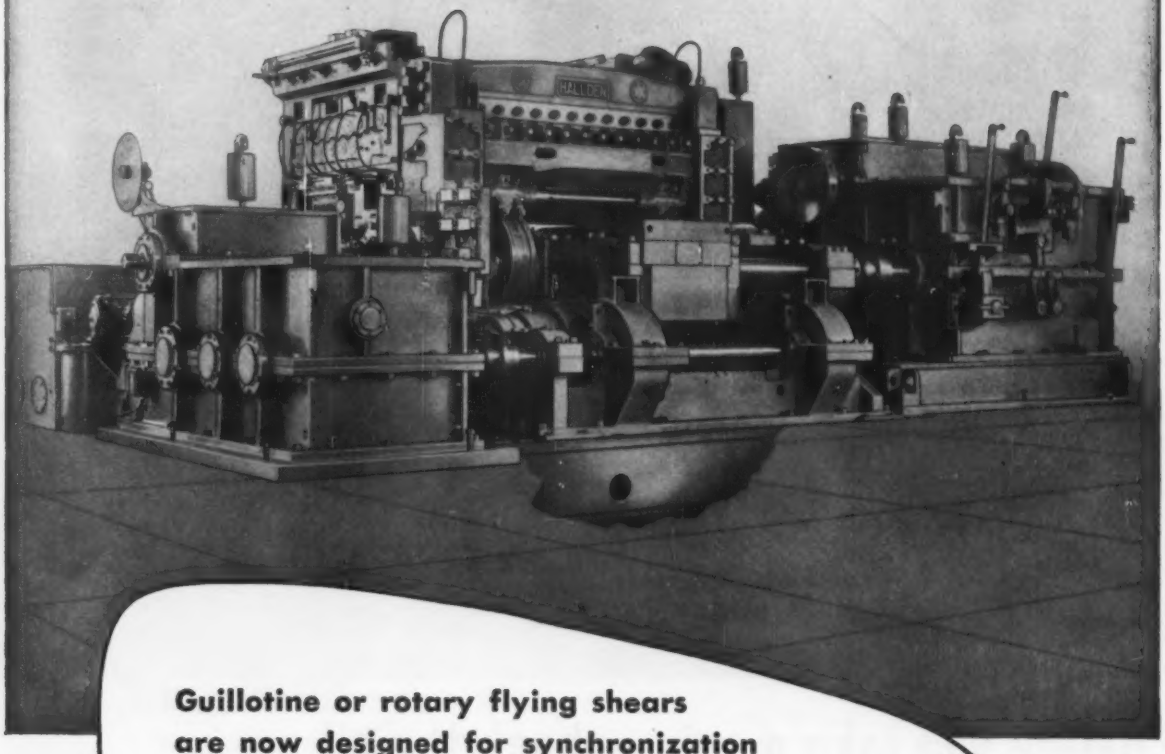
USS Stainless Steel is available through your USS representative or your local steel service center.

USS is a registered trademark

United States Steel Corporation – Pittsburgh
American Steel & Wire – Cleveland
National Tube – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

USS United States Steel

SYNCHRONIZED "On the Fly"



Guillotine or rotary flying shears are now designed for synchronization adjustment without stopping the machine.

Automatic Shears

designed and built by

HALLDEN

THE SHEARING SPECIALISTS

THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

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CONSUMER CONFIDENCE IS GROWING. This could lead to stepped-up buying of consumer durables if the economy continues to perk up. But so far, says the University of Michigan, its economic pulse takers report there's a tendency to hold back on major purchases.

ROADBUILDING EQUIPMENT MAKERS are feeling the pinch of foreign competition. Industry sources say equipment from Britain, Germany, and Italy is cutting into U. S. sales abroad. Foreign builders are underselling U. S. firms by as much as 25 to 30 pct.

MILITARY OUTLAYS FOR RESEARCH and development are becoming more centralized. National Science Foundation reports Defense Dept. spending has grown from $37 million in '57 to $428 million this year. Outlays by the three military services meanwhile have held at about $2.1 billion for the last three years.

CONSTRUCTION SPENDING is running ahead of last year. Dept. of Commerce says outlays through November were $45 billion, or $700 million above the same period in 1957. Private spending was off, but public outlays more than made up the decrease.

PLANT AND EQUIPMENT LEASING is big business. So reports the National Industrial Conference Board on the basis of a survey. It says 75 of 221 companies polled reported they are renting more equipment and plants than they were five years ago.

$95 BILLION FOR MODERNIZATION. That's what E. J. Hanley, president of Allegheny Ludlum Steel Corp., says industry will have to spend to assure continued prosperity and ability to compete in world markets. He believes the job should be started right away, with cooperation of government and labor.

MORTGAGE LOAN REPAYMENTS have held up well despite the recession. In the first nine months of 1958, delinquencies ran at the rate of 2.2 pct, only slightly higher than the 2.0 pct for the same period last year. Figures were compiled by the Mortgage Bankers Assn. of America.

INDUSTRIAL MACHINERY SALES are moving up, says Republic Steel's T. F. Patton. He forecasts that machinery makers will use 20 pct more steel next year than their estimated use this year.

AUTOMOTIVE CAPITAL SPENDING will total $646 million this year, according to the Dept. of Commerce. This is the lowest level since 1950. Industry economists say spending in '59 will be about the same. Industry spent record $1.8 billion in 1956.

STEEL OUTPUT IN 1959 will hit somewhere between 102 and 110 million tons, according to industry sources. Forecasts are based on expected upturn in output of major steel users. Steel production this year is expected to be about 85 million tons.

FREIGHT CAR SHORTAGES are a real threat in the near future. This is the opinion of David C. Melnicoff, economist, The Pennsylvania Railroad. Mr. Melnicoff points out that the railroads are badly in need of new equipment even now, when business is still recovering from the recession. He expects the car pinch to come next year as rail carloadings rise.

8 coordinated Clevelands power National Tube's unusual tempering furnace

A total of 8 coordinated Cleveland Worm Gear speed reducers work in harmony to transmit power on National Tube's tempering furnace at McKeesport, Pa. Vital to their Warm Working Process, it heats pipe 900-1000° prior to entering the sizing mill.

Operating from a single power source these Cleveland right-angle drives handle the huge job of power transmission required to keep pipe production at high output rates.

That's a big reason why compact, rugged Cleveland Worm Gear drives are found in plants across the country where heavy-duty drives of proven dependability are required.

Cleveland's new Bulletin 145 gives the latest specifications on the entire line of speed reducers. Write for your copy today. The Cleveland Worm & Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.

CLEVELAND
Worm Gear
Speed Reducers

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

Consumer Confidence Picks Up

Survey reports a major upturn in buyer confidence. Historically, it precedes an upturn in durable goods sales.

Aftermath of recession and fear of high prices may keep sales follow-up below '55 level.

■ Consumer confidence in the general economic picture has taken a big jump since earlier this year. But it has not been translated into any great eagerness to sign on the dotted line for major purchases.

However, the big boost in confidence, if backed up by a continuing favorable rate of income, should result in improved purchases.

Recession Effects—But lingering effects of the recession and general dissatisfaction with price levels will tend to keep durable goods purchases in 1959 below the rate of the 1954-55 business upsurge.

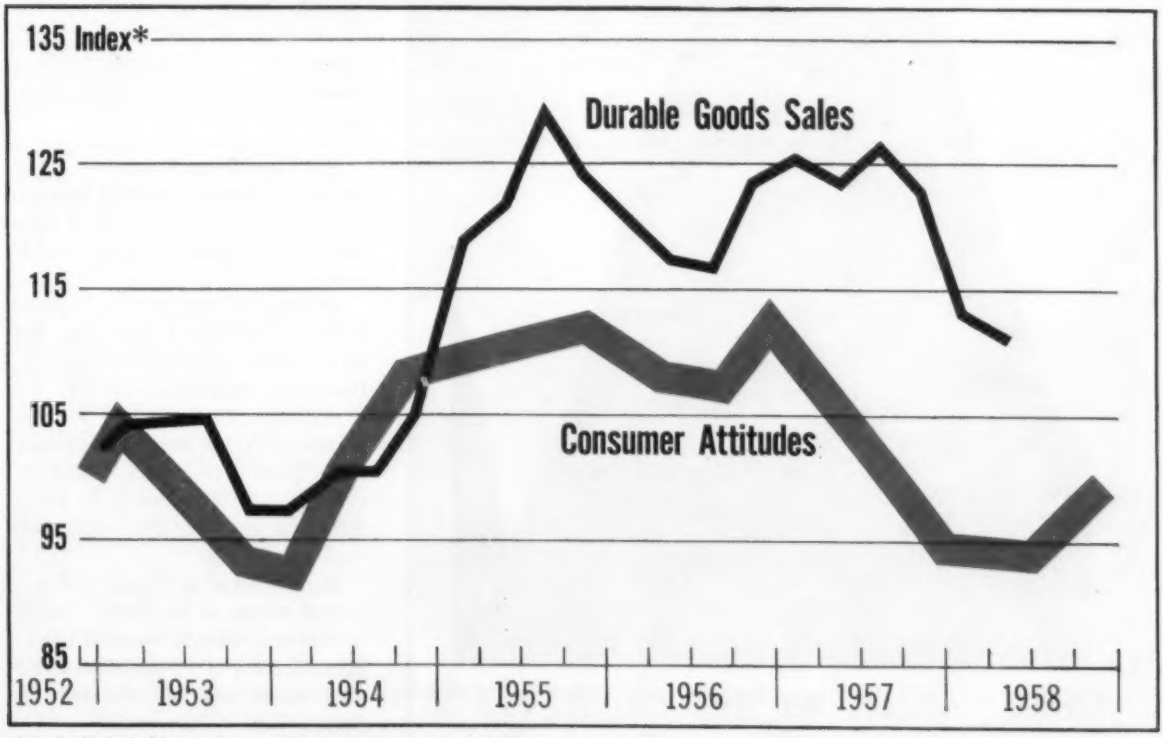
These are some conclusions and interpretations drawn from the Survey of Consumer Attitudes and Inclinations to buy. Conducted in October by the University of Michigan Survey Research Center, it probes the consumer's financial life in an attempt to learn his buying plans.

Buying Will Follow — The apparent paradox of brimming confidence measured against a much less enthusiastic intent to buy may not be as critical at it looks at first glance. Since the survey was launched a decade ago, significant changes in attitudes have repeatedly been followed by corresponding changes in durable goods sales.

This means that if nothing is done to impair the recovery of buyer confidence, intentions to buy will tend to follow. (See chart.)

In evaluating the reasons behind consumer confidence, the survey shows that, compared with last

Lift in Consumer Spirits Forecasts Durable Goods Upturn



*Index Durable Goods Sales based on U. S. Department of Commerce quarterly data; last quarter 1952=100. Consumer Attitudes are Survey Research Center data; Nov-Dec. 1952=100.

May, more families are better off financially; their income is higher than a year ago; and they expect to be better off next year.

The Center's Index of Consumer Attitudes (compiled from answers to key questions) jumped from 94 last June to 100 in October. The previous peak, reached in late 1956, was 112.

Adverse Factors — This means that although consumer sentiment has improved, confidence has not been completely restored. There are two principal factors contributing adversely to confidence: Lingering job insecurity and fear of inflation.

One out of every five Americans still worries about job security, the survey discloses. Business news has been mixed and many have friends and neighbors out of work or on short hours.

But the survey indicates dissatisfaction with rising prices is the most important adverse factor. The large majority of consumers say that probability of higher prices is bad for consumers, and is reflected in intent to buy.

Appliances, Not Cars—Overall, more people intend to buy now than did in June, but that number has not risen above the relatively low level of November-December 1957.

In the crucial area of auto demand, the survey gives a clear indication of some shift from new to used cars. Frequent complaints involved cost. However, the October survey was too early to reflect whatever impact new models may have had on buying intent.

On the other hand, opinion that now is a good time to buy houses and other major household goods is more widely held than last fall.

Behind 1954 — Interpreting the upturn in consumer attitudes, the survey compares current results with 1954.

Between early 1954 and October, 1954, the Index of Consumer Attitudes rose 16 points, from 93 to 109. The 1958 improvement has been slower, with a rise from 91 to 100.

In 1954 none of the major components of the index showed a worsening of attitudes. But in 1958, price dissatisfaction led to a fall in the component measuring attitudes toward market conditions.

Finally, buying intentions have improved only slightly since this June, while in 1954 they contributed substantially to the rise in the index.

Conclusion: "It therefore appears likely that in 1959 the recovery in durable goods spending will be slower than in 1954-55 and more dependent of favorable income trends (generated by other industries)."

But Confidence Returns—One of the most dramatic changes between June and October occurred in evaluation of general business conditions.

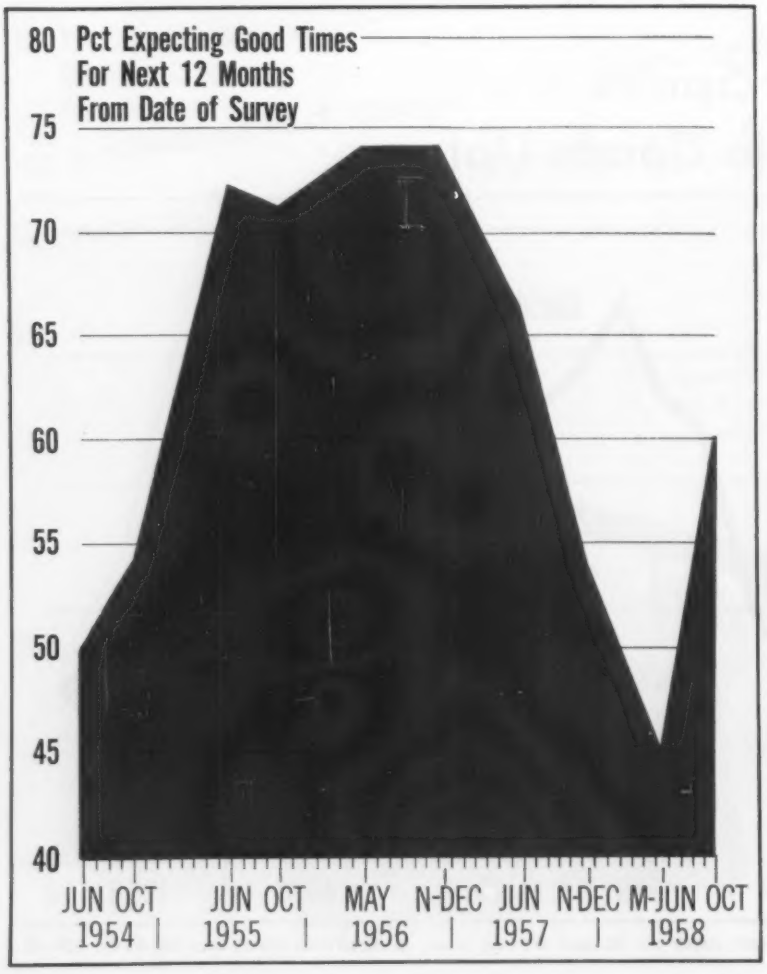
In June, 68 pct believed business to be worse than a year ago. But in the short span of five months, this group dropped to 28 pct.

Similarly, the belief that business is recovering is more widespread, rising from 7 to 35 pct. Upper income people, who tend to be better informed, are much more optimistic than the average.

Improvement in expectation is a logical result of the better feeling in regard to current business conditions. A total of 10 pct believe that good times will last through the coming year.

However, optimism about the

Buyers See Good Times Ahead



business outlook is less general than in 1955 and 1956 when 70 to 75 pct predicted good times.

More Income—Many families report improved financial conditions, but the impact of the recession lingers. About 25 pct of families reported this October that they suffered unemployment or shorter hours in the past 12 months.

However, in recent months the situation has taken a turn for the better, with 31 pct believing that they are better off than a year ago.

The improvement in recent changes in personal finances is the largest registered by the survey for any half-year period since 1952.

The Worriers — Most common worry? Job security. One out of every five families worries about steady employment. Only 9 pct mentioned this worry in 1956.

On prices, rising price levels are generally resented and the prospect of continuing rising prices is viewed unfavorably. Some believe they are indicative of an active demand, and to the good, but that is a small minority.

The most common arguments are that wage increases tend to lag behind price increases, or that high prices prevent people from buying anything but necessities.

Time to Buy—Do you think now is a good time to buy? The survey reports that this question usually gets the same answer for all products, whether applied to houses, cars, or large household goods.

But in October there were clear differences in response for different products.

For household goods, opinion of the market was considered good, by a margin of two to one. But that didn't hold for houses and cars. However, it must be kept in mind that the survey was taken in a period of general disenchantment with 1958 automobiles.

However, the reason for believing it was a bad time to buy did not reflect poor economic conditions. Instead, high prices were blamed.

Ultrasonic Welding

▪ A new Westinghouse technique opens the way to easier welding of dissimilar metals.

Under development at the company's Pittsburgh materials engineering department is an ultrasonic seam welder that eliminates need for surface preparation prior to welding.

Silver to Copper—Already, engineers have succeeded in welding light silver foil to ¼-in. copper strap at a rate of 20 in. per minute. Also, two sheets of aluminum 0.010 in. thick have been seam welded continuously at a rate of 15 in. a minute.

"The new apparatus will weld dissimilar metals which are not now weldable by fusion processes," says Dr. C. E. Arntzen, manager of the department.

Bypasses Deformations — The only other available method for joining dissimilar metals is that of cold welding, he explains, but this method has the very serious disadvantage of requiring a large deformation of the metal pieces being joined. Ultrasonic welding does not require these large deformations.

Kneading Action—In operation, no electric current is passed through the spot being welded by the new machine, although in appearance, the ultrasonic seam weld is similar to that of an electric weld.

Sheets of metal to be welded are passed between two wheels vibrating at 20 kilocycles per second. At the point of contact, the wheels break up the oxide coating on the metal surfaces and, by a kneading action, weld the metal lattices on the surfaces of the metals themselves.

VIBRATIONS DO IT: A weld of two 10-mil-thick aluminum straps is shown being completed by an ultrasonic seam welder developed by Westinghouse. The technique has been used successfully to join dissimilar metals.

SUB Gets Legal Setback in Ohio

Steel Companies May Appeal Adverse Court Ruling

Ohio Supreme Court has ruled workers can't accept supplementary unemployment funds and state aid at same time.

But both large industries and labor are united in effort to get Ohio approval for SUB.

■ Supplementary unemployment benefits took an unexpected legal setback in Ohio last week. But the way is being cleared for new legislation next year to put them into effect.

The State Supreme Court in a 5-2 decision reversed the Youngstown Common Pleas Court and ruled that workers cannot simultaneously collect both SUB and state benefits. In effect it upheld the earlier ruling of J. R. Tichenor, administrator of the Ohio bureau of unemployment compensation, which held up distribution of $10 million of an estimated $25 million accumulated for unemployed workers since mid-1957.

Steel Firms May Appeal—About 270,000 workers in Ohio are now covered by SUB plans. Four major steel companies operating in Ohio —U. S. Steel, Republic, Jones & Laughlin and Youngstown Sheet & Tube—are studying whether to file an appeal within 14 days and have withheld comment. Industries most affected are auto, steel, rubber, glass, and electrical.

DiSalle's Support—At worst, the setback appears temporary. With large manufacturing companies having already adopted it and united with labor in implementing it, SUB legislation should be speeded. Democratic Gov.-Elect Michael V. DiSalle has also indicated his support.

"All through the campaign I held that labor and management should be encouraged to provide for themselves whenever that is possible, rather than rely on the government," he said. "By providing through contracts for supplementary unemployment benefits, they in effect, remove the burden from government."

Opposition Active—Some opposition which would be more of a delaying tactic is expected from the Ohio Information Committee. Fred Mulligan, executive secretary, has indicated the committee intends to push for a state referendum on the question.

Additional opposition is also expected from smaller firms as well as from non-manufacturing firms like retail stores, banks, and insurance firms which are against the principle. Steel firms have also felt some pressure from customers to resist SUB.

Meanwhile the new ruling will cloud labor negotiations in Ohio and, in effect, take SUB out of the realm of collective bargaining. Once companies and unions are agreed upon a certain cents-per-hour package, the unions generally have an option whether to take it as a straight increase, as SUB benefits, or other fringes.

What's Included — Some Cleveland firms with only 100 employees came into it that way. With the new ruling, provisional retroactivity clauses are improbable and there is little point in negotiating on it. Other facets which have been absorbed into SUB are also held up.

Ford's settlement this year, for example, included separation pay as a SUB provision with funds already being paid in. Once accepted, efforts are also made to integrate the plan with state provisions and keep pace with them. Ford, for example, this year extended the plan from 26 to 39 weeks, the same period covered by Ohio provisions.

Are Benefits Pay?—Major point of difference found by the court was whether unployment benefits are remuneration for work.

The majority held they are, since workers hold seniority and pension rights. But the minority said they are not, since workers are not working. Union contends payments are an equity built up through deductions and payments.

History of Ohio SUB Snarl

Controversy over supplementary unemployment payments in Ohio goes all the way back to 1955.

Here's what happened before Ohio Supreme Court ruling against SUB last week:

In 1955 the CIO initiated a petition to permit effective SUB in Ohio. However it was defeated by a popular vote of 2 to 1. A similar proposal was turned down by the Ohio legislature in 1956. Later sessions also failed to act on two measures dealing with supplementary unemployment benefits.

Ohio's basic compensation law dates back to 1937. It is similar to laws in states which have approved SUB. But Ohio administrator J. R. Tichenor and the State Supreme Court don't see it that way.

Executive Earnings Stood Still in '57

Top management men stood still in terms of total compensation last year.

As a whole American and Canadian executives continued to work for about the same compensation, according to an American Management Association survey. This is in contrast to studies in previous, non-recession years when the executive group increased their average compensation by 5 to 6 pct a year.

Bonuses Down—During the time covered by the latest AMA compensation study normal salary increases were offset by lower bonus payments. But there were wide variations within industries represented by the 3500 companies supplying data.

The stand-still status of compensation reflects economic conditions existing during the period covered, according to Dean H. Rosensteel, director of the AMA Compensation Service. Seven out of ten companies reporting had sales increases, he notes. But only half of the companies whose sales increased also had increases in profits. This compares with a 70 to 80 pct average in more normal years.

Boosts for Some — In the survey salaries were reported as of the first of 1958. Bonus payments and retirement contributions were on the basis of amounts earned or accrued in 1957 and paid early in 1958.

Results of the survey showed:

Higher salaries than in the previous year were paid to 47 pct of the positions included; lower salaries to 11 pct; and the same salaries to 42 pct. These percentages were not much different than those of more normal years.

Size the Same—In addition, the size of salary increases did not change during the survey period. For the executive group they ranged from 5 to 15 pct of salary. In some exceptional instances they were larger, depending on company growth and performance.

JOHN L. LEWIS: One more twist to the continuing wage-price spiral?

Miners Get More

▪ John L. Lewis, crusty, tough czar of the country's coal miners, has won one of his most powerful organizational victories of recent years in a new contract with the soft coal operators.

The contracts, signed last week, will undoubtedly push coal prices upward, fuel economists say. Some companies have already announced increases.

'Buy Union' Clause—In addition to a two-step pay raise totaling $2-a-day and longer paid vacations, Lewis won from the independent bituminous coal operators an agreement that they will no longer buy cheaper non-union - produced coal.

The operators for many years have been buying this cheaper coal from small non-union mining operators to mix with their regular production. It has in effect lowered production costs and permitted them a flexibility in pricing. But no more.

No Way Out—For the great mass of small, non-unionized mines, it means an end to one of their biggest markets. This will mean that if they want to recapture their sales to the major producers, they'll have to agree to unionization.

About 20 pct of all bituminous coal produced comes out of non-union mines.

New Wage Scale—The new contracts go into effect Jan. 1. They provide for a raise of $1.80 a day then, and an additional 80 cents next April. Present wage is $22.25 a day and up. In addition, vacation pay will be increased from $180 for 10 days to $200 for 2 weeks.

Edward G. Fox, president of the Bituminous Coal Operators Assn., said the protective wage clause was signed "only to avoid an interuption of the supply of the world's most dependable fuel to coal customers."

SAME SONG: In August 1929, the Denver Post threw the spotlight on Russia's dumping of manganese that all but put the U. S. industry out of business. In June 1958 the New York Herald Tribune again used the editorial cartoon to point out that the Reds were up to a streamlined version of their old tricks again.

"Looks Like the Threat of a Hot War Has Receded"

New Look in Economic Warfare

Trying to weaken capitalist economies with trade is an old Russian trick.

But the Reds have streamlined their approach since they first started.—By F. J. Starin.

▪ Today, as 28 years ago, dumping is a front line weapon in the Russian arsenal for waging economic warfare.

But the State Dept. doesn't take the bargain basement sale of some Russian metals on Free World markets this year too seriously. The reason: The picture is changing.

A State Dept. official pointed out that the Reds must make some sales in the Free World at any price to get foreign exchange. Because the Russian economy is controlled the ruble has little value in world trade.

Surplus Sales—The State Dept. also believes that Russia's production of basic metals may have temporarily outdistanced her facilities to work the metal. It says the sale of platinum, aluminum and tin that stung Free World suppliers in 1958 was merely disposal of surplus.

Both Commerce and State Dept.'s are more concerned about the possibility of Rusia dumping manufactured products in the years ahead.

Soft Spot—In the State Dept. the feeling is that items related to the military are most vulnerable. "Soviet military goes first class," said one spokesman. He added that since they aim for top quality, and since over production is infinitely more desirable than shortage, such by-products as machine tools and instrumentation are liable to be in enough supply at cut rate prices to hurt Free World competitors.

A more serious immediate threat in the eyes of both Commerce and State Department is the Soviet technique of using trade to make friends and influence markets.

The Reds will buy surplus items they don't need, sell needed products at loss prices, make loans at ridiculous rates, and supply and train technicians in any country they want to cultivate.

How—Examples are easy to find. Soviet fishermen can catch more fish than the population wants, yet Russia made a major purchase

from Iceland, where U. S. prestige is now on the wane.

A government observer in India saw Russian gear shaping machines in a new plant that were exact duplicates of the Model 7 gear cutter of Fellows Gear Shape Co., Springfield, Vt. The Indian buyer told him what he paid. Fellows couldn't have possibly touched the price, he said.

To get this machine, or any other Russia wants to duplicate to save years of development, she offers package deals. She'll pay an attractive price for a surplus commodity, and the wanted item.

Techniques—Russian loans are usually at 2½ pct interest, out of the Free World's class.

In addition, the Reds can adapt easily to specific situations, making it difficult for U. S. observers to anticipate. For instance, Russia put the economic screws to Finland to bring down their "unfriendly" Socialist-Conservative cabinet.

The tools with which U. S. government agencies must work to judge the potential of the Russian threat and come up with the answer are meager. Russian trade statistics are better than they have ever been, but they still contain good camouflage. No one in the U. S. is quite sure what "technical engineering products" includes. And, while Russia claimed to be the sixth most active trading country in 1957 with a turnover of $8.3 billion, only about $1 billion left the Soviet bloc, about the level of Denmark.

Coordination—Coordination between the U. S. government agencies involved appears to be fair. Commerce Dept. is interested because trade is the vehicle. State Dept. is on the spot because of the political overtones. Even Defense should be interested because it is a form of cold war. There are study-type committees that include lower echelon representatives from several agencies. And U. S. embassies abroad pass the word along on any new Red moves. But there appears to be little direct communication at the top.

Steelmen's Answer To Foreign Competition

Two leading steelmen, speaking at about the same time in different cities, last week focused on the problem that is fast becoming the No. 1 headache of U. S. industry—foreign competition.

They defined the problem, explained how bad it is now, and why it is important to come up with the right answer.

▪ Roger Blough, chairman of U. S. Steel Corp., told the Newcomen Society in New York that only with "the finest tools of production on earth" can U. S. industry hope to win the contest for world markets now being waged with foreign competitors.

Mr. Blough called on labor not to "cost" American products out of world markets, and on government to revise depreciation laws, and not to impose penalties on investment.

High Cost—In Buffalo, E. J. Hanley, president of Allegheny Ludlum Steel Corp., told a regional meeting of the American Iron and Steel Institute that the cost of the necessary modernization and mechanization to meet foreign competition would be about $95 billion.

Both men agreed on the basic advantage enjoyed by foreign competitors that U. S. industry would have to overcome.

Cheap Labor—Mr. Blough, in anticipating a more keen contest ahead said, "Operators of machines of production in foreign lands will receive only a fraction of the compensation they are paid in this nation."

Mr. Hanley said simply, "The principal advantage enjoyed by foreign competitors is the lower unit cost of labor."

How bad is the problem? Mr. Hanley told this story: "The India Supply Mission sought to make certain steel purchases here. Prices bid by American steelmakers ranged from $242 to $291 per ton. The Japanese bid was $99.98 per ton. Want to guess who got the order from India?"

Vital—How important is the issue? Mr. Blough pointed out that since World War II, 20 or more new nations have come into existence. The population overseas is also stripping the U. S. in percentage of growth. By 1980, the U. S. will have about 260 million people while the total in the world will have grown from 2.9 billion to 4.2 billion.

And the competition for this market is growing. The U. S. is still the leading industrial nation in the world. But other countries are moving up. In steel, for example, Mr. Blough says that since World War II at least 20 other nations have trebled their output, while others are starting to make steel for the first time.

The U. S.'s share of the world market has dropped from 54 pct in 1946 to less than 30 pct in 1958, says Mr. Blough.

Program — Mr. Hanley presented a three-point program that he considers vital to overcome the problem:

1) Substantial improvement in productivity and moderate wage cost increases.

2) Revision of tax laws to encourage capital investment by permitting the accumulation of funds to replace old equipment.

3) Amendment of the Full Employment Act to "make stability of the consumer price level an explicit and solemn objective of the nation's economic policy."

How Small Business Loan System Works

Lenders Organize—The new Small Business Investment Act sets up a $250 million revolving fund for use of private investment companies. Companies must be formed by a minimum of ten persons, have at least $300,000 in capital and surplus as a qualifying start.

Borrow From SBA Fund — After investment firms are organized they borrow from Small Business Administration fund by purchasing debentures up to the limit of $150,000 a company. Beyond initial loans from SBA they are encouraged to rely on private capital. But a company may get up to 50 pct of its paid-in capital from SBA.

And Lend to Business — Investment companies then make loans to small businesses eligible under the new law. To get financing, business firms sell convertible debentures to an investment company. Company may exchange these for stock in the borrowing business. Borrower must purchase stock in loan company amounting to 2 to 5 pct of the amount covered by debentures.

Total investment in any single business by an investor must not exceed 20 pct of the loan company's paid-in capital and surplus. No time limit or interest limit is placed on the debentures. But general SBA approval of the investment company's program must be obtained.

Loan Plan Aids Small Business

Doors opened with new investment act so more loans can be made to small business.

System sets up private investment firms, partly financed by Federal funds.

These, in turn, make business loans.—By G. G. Carr.

■ Almost everyone should be happy with the Small Business Investment Act of 1958.

That was the summary of speeches at the American Management Assn. briefing session on the new laws in New York last week. Government and private experts on small busines financing and taxes spelled out the meaning and implication of the new regulation.

New Loan System — The Small Business Investment Act sets up a $250 million revolving fund to underwrite a new system of private investment companies which will lend to small business. (See box). The fund was started with a $50 million appropriation this fiscal year. Congress will add another 100 million in each of the next two years.

The Small Business Administration will lend from this fund to the new investment companies up to a limit of $150,000 per company. The investment companies will then make loans to small businesses which are eligible under the new law. Loans are originally for a 20-year period, but may be extended for 10 years more.

Who's Eligible? — To qualify as small businesses under the new law, companies generally must fall into one of these categories:

Retail and Service Trade Firms: Most of these are "small" if their annual gross sales are $1 million or less.

Wholesale Firms: Most of these are small if annual gross sales are under $5 million.

Manufacturing: Companies in this category are small if they employ 250 workers or less, and large if they employ 1000 or more. If they employ between 250 and 1000 workers, definition depends on kind of industry.

Lender Advantages — Great attraction to investors is that new plan gives them a relatively risk-free way of backing small companies

Charles M. Noone, tax counsel, Danzansky & Dickey, Washington, pointed out two further advantages:

Investors may treat losses on either stock or debentures as ordinary rather than capital loss.

Small business investment companies are allowed a 100 pct deduction on amounts received as dividends whereas other corporations are allowed only 85 pct.

Open Door Approach—State and local development companies may also obtain SBA funds for small business financing. Whole purpose of the small business law and affiliated legislation is opening doors rather than setting up roadblocks to small business financing.

Waste Nitrogen Finds a Home

It Will Be Piped Into Mill Annealing Lines

First large-scale use of nitrogen from oxygen-making process is planned.

It opens the door to a new market, improved steel, cost savings.—By K. W. Bennett.

▪ Oxygen producers have found a use for the pig's squeal.

Nitrogen, which is largely a waste by-product in the oxygen making process, will soon be piped into annealing furnaces by the ton.

For the first time in the steel industry, a mill will use as its sole source of annealing gas the nitrogen by-product of its own oxygen plant. Plans have already been made by U. S. Steel Corp. and Linde Air Products, Inc. A unit is expected to be in operation by 1960.

Economy Dictates. — Using by-product nitrogen mixed with hydrogen obtained by reforming natural gas (another pioneering step), the plant will supply all annealing gas for a major sheet and tinplate mill.

The decision to go ahead with the new development is aimed at:

1. Obtaining better - appearing sheet.

2. Economies available through use of waste nitrogen.

Others Have Tried—Both Tennessee Coal and Iron Div., U. S. Steel, and Bethlehem Steel Co. have worked with similar processes, but the new plant will be the first to depend entirely on by-product nitrogen for all annealing of sheet products.

Many mills have already swung from the lower carbon content annealing gas to improve sheet appearance. Use of pure nitrogen plus hydrogen is expected to further improve the product.

While no one has mentioned it publicly, the development could be of prime importance to builders of oxygen-making equipment since it marks an important new market for nitrogen. Increased nitrogen use could mean lower prices for both oxygen and nitrogen.

A Windfall — This unexpected new market for a waste product comes as a windfall to oxygen producers, who aren't desperate for new markets. Oxygen production this year should exceed 1957 levels by 18 pct. In volume, this represents about 38.7 billion cu ft of the gas. It's an all-time high for the industry.

High purity oxygen is used heavily in all phases of metalworking, as a missile fuel, and to a lesser extent in chemical and processing industries.

Tonnage oxygen (95 pct or lower in purity), is moving up at an equally strong rate. U. S. production is about equally divided between high purity and tonnage output.

Liquid Trend—An estimated 100 oxygen producers in the U. S. operate about 330 plants here. Some have producing units in foreign markets. All are in the process of a unique type expansion that will result in fewer, but much larger, plants. The trend is toward production of liquid rather than gaseous oxygen.

Linde Air Products, Inc., biggest of the liquid oxygen makers, is switching virtually all of its plants to liquid output.

Linde and other builders will continue to construct on-site gaseous oxygen producing plants for smaller mills, however. These one-customer units are an important market. Over one-third of 1957 high purity oxygen output came from such plants.

Indicative of the capital investment involved, National Cylinder Gas Div., of Chemetron is working on two plants totaling $750,000. One, on the East Coast, will be able to handle a major portion of the firm's business in that area.

Mutual Benefit—Metalworking is the oxygen makers' biggest customer. And oxygen producers are a steadily-growing market for metal products. Nitrogen will mean more business for both parties.

Enough Nitrogen for Everyone

For each cubic foot of oxygen produced from air, approximately four cubic feet of nitrogen remain.

With 1958 oxygen production expected to reach 38.7 billion cu ft, it leaves behind an almost astronomical cu ft total of unwanted nitrogen.

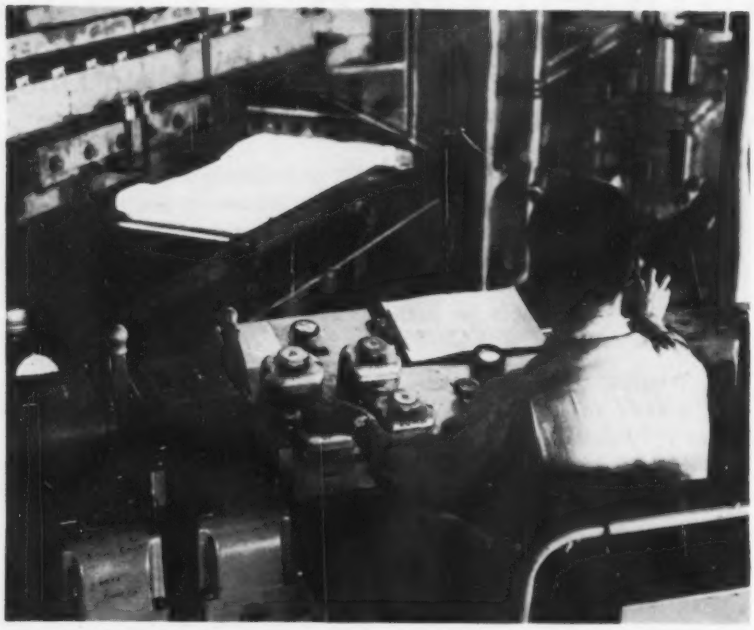
The trend toward more oxygen steelmaking processes, and increased use of oxygen as a missile fuel points to higher production in the years ahead—and even greater amounts of nitrogen by-product.

High Purity Oxygen Production

1954	22.1	billion cu ft
1955	29.3	" "
1956	33.3	" "
1957	32.8	" "
1958*	38.7	" "

*estimate

New Western Slabbing Mill



UNIVERSAL: The newest and largest slabbing mill on the West Coast has been put into operation at Kaiser Steel's Fontana, Calif., plant. It boosts both vertical and horizontal rolls. Kaiser says it is the first in the West with vertical rolls. It is one of the heaviest pieces of equipment in the Fontana plant, weighing about 2.5 million lb.

Mills Catching Up On Improvements

Slack steel production in 1958 had one benefit for steel companies. It gave them a chance to catch up on capital improvements.

The American Iron and Steel Institute reports that, as a result of modernization programs completed during the year, steel mills now are better equipped than ever before.

A Partial List—Here is some of the equipment that has been added to U. S. steelmaking capacity in 1958:

Approximately 20 rolling mills. Most are new, others rebuilt.

Eight new steelmaking furnaces, mostly electric units, plus enlargement and rebuilding of several furnaces.

A new oxygen steelmaking plant, the largest in the world. Another is being built.

New sintering plants having a total capacity of over 20 million tons.

Five large continuous annealing lines for strip production.

A $300 million taconite plant.

Five new research centers.

Nears $1 Billion—Also added to steelmaking capacity were three electrolytic tinplate lines, four coke oven batteries, several new pipe mills, numerous pilot plants, and scores of improvements such as new controls, better instrumentation, and auxiliary equipment.

The Institute estimates that total industry outlays for capital improvements this year may come close to the $1 billion predicted last February.

New Rail Rates

Rail rates on iron and steel pipe and tubing shipped from Sault Ste. Marie, Ontario, to Chicago may be reduced soon.

These metal products are covered by the initial U. S. railroad proposal to offer "agreed charges" to industrial shippers. The Soo Line R.R. has notified the government of its intention to lower the Sault Ste. Marie-Chicago charges about $2 a ton to meet water competition.

Present rate on carload lots of steel, wrought iron pipe or tubing (welded or seamless), is $12.18 per net ton. The Soo has asked the Western trunk line committee, in Chicago, for emergency consideration of a rate of $10.05 per ton on a minimum weight of 80,000 lb per car. The committee's approval and Interstate Commerce Commission endorsement would permit the new rate to take effect.

The proposed rate action is similar to agreed rail charges now available in Canada. Under this guaranteed rate plan, the shipper is assured there will be no change in the rate for 12 months. Also, the railroad is guaranteed that a stated percentage of the tonnage will move by rail during that time.

War Plant Planning

Private industry will play an increasingly large role in physical production of military weapons, fuels, and other equipment.

The growing switch from production in government-owned plants to reliance on private industry for defense tools is a result of the change from conventional arms to space-age weapons. It also reflects the reliance by the military on having its equipment on hand under short-war planning.

In any future emergency, whether it's a global atomic conflict or a limited conventional war, "primary reliance will be on private industry to provide the major portion of productive capacity required for war production," military leaders are telling Congress.

Military procurement officials have discovered it is frequently cheaper to expand an existing private plant to produce new equipment than it is to convert government plants.

CTRONIC ONTROL YSTEMS

LEADERS IN NUMERICAL CONTROL

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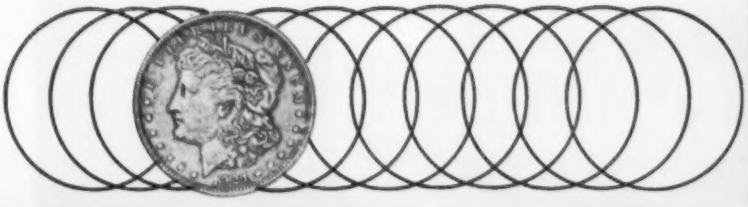

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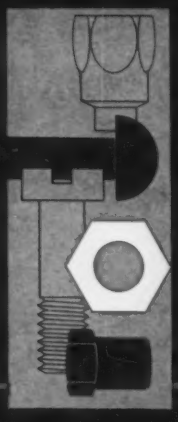

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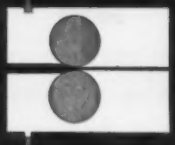

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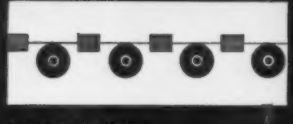

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WF-51R

Mr. and Mrs. Morris Bean

Art Lends a Hand to Founders

A husband and wife team who dabbled in art have made an important contribution to foundry practice.

Their process is widely used in producing precision castings from aluminum.

▪ In the depression days of the early 30's, two graduate students —a man and a woman—found a common interest making artistic castings in a college foundry in Yellow Springs, O.

They little suspected that the fine statues and ornamental pieces they turned out, and the new way they found of doing it, would one day help out the aircraft and missile industries in time of need. They never dreamed that one day they would be known as the founders of the precision aluminum castings industry.

Still At It—Morris Bean and his wife Xarifa are still making castings. He is president of Morris Bean and Co., and she is full-time, working research director. Their plant is located at Yellow Springs, near Antioch College, where they got their start. The process they developed bears the name of the college.

Today, the castings are used in atomic work, aircraft, missiles, and for precision tire molds. In World War II they helped Allison Div., General Motors Corp., develop more powerful aircraft engines without added weight. Over 25 foundries in the country licensed the Antioch process, principally for close tolerance defense work.

Good House Keeping—Mr. Bean believes that aluminum and magnesium have a significant niche in the space age. His company is acknowledged as the forerunner in upgrading these metals to today's tolerances and surfaces.

MORRIS AND XARIFA BEAN: A better way to cast aluminum.

The ultra-modern Bean foundry has a woman's touch. It looks more like a spic-and-span dental lab than any foundry you've ever seen. But it puts out the work. Some typical jobs: Aircraft skin castings 3 x 5 ft with tolerances of 0.010 in. on mating surfaces; thicknesses cast to 125 rms face finish as cast; huge 9 ft dia., 2000-lb tire molds produced in quantity to ±0.060 in. tolerance.

Though relatively small, the Bean foundry competes successfully against a host of newer arrivals in turning out such items as torque converter elements, microwave parts, pressure-tight housings.

Plaster Mold Used—These castings are a far cry from the objets d'art the Beans started with over 20 years ago. But the basic casting principle is unchanged. The Antioch process is built around a plaster type mold material combining the reproduction properties of plaster and metallurgical advantages of sand. The mold freezes metal rapidly, is dimensionally stable, and has good permeability.

how to rustproof cold rolled steel in shipment and storage

Proved by actual test! Unwrapped steel rusted within a few hours. Identical steel wrapped in Ferro-Pak showed no signs of rust . . . even after several months. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong, yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 4805 South Whipple Street, Chicago 32, Illinois.

How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.

How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

FERRO-PAK®
by Cromwell

For over 38 years—
"Paper Engineers" for Steel

Business Confident But Cautious

In spite of evidence of improving business, few executives are willing to abandon conservative attitudes.

It tends to slow the rate of recovery, but it assures gains based on solid achievement.

■ The steady pace of the recovery continues, with no indication of an early leveling off.

But in spite of this consistent rate, most businesses are meeting the improvement with caution. There is little, if any, tendency to go overboard with bullish attitudes.

Still Conservative—For the most part, this conservation in the face of the recovery is viewed favorably. It means there is little over-extension anywhere, that the upturn in indicators is based on solid fact, not inflated optimism.

For example, inventories have now ceased to contract, and purchasers are trying to build up stocks of materials. This intent to build up is not to lengthen supplies in terms of "days." It is intended to meet accelerated production schedules. The tendency to keep operating close to the vest is unchanged. But it takes more material to do even that.

New Orders Mount—The change in inventory policy is only one of the noticeable factors reflecting, and contributing to, the continued recovery.

One of the most important is that new orders are still on the upgrade. For the second straight month they exceed sales. Since orders mean future sales, this trend is vital to short-term business predictions.

Another factor is that durable goods sales continue to climb. Department store and other retail sales figures indicate the improvement in consumer attitudes (See Special Report, P. 89) is already being reflected in consumer intent to buy, which was not apparent earlier in the fall.

Ask Your Dealer—No discussion of future business trends can escape comment on the auto market, indefinite as it may be at the moment. All you can do is watch production figures and sales. It might be a good thing to talk to your dealer friends and get their real opinion of the market. At a time like this, they may be closer to the market than company economists.

In view of the continued business improvement, manufacturers are taking another look at their capital expenditure budgets. Apparently the negative viewpoint of the first half of this year, when capital appropriations were at the bottom, is in the process of being reversed.

Here again, plans are characterized by conservatism. But there is more of a tendency to spend, if it can be thoroughly justified. Business doesn't show any eagerness to expand its capital goods outlays to any great extent, but the decline has halted and some improvement is under way.

Fall Leveling Only Temporary

October Gains—You can get a good idea of the recovery pattern by studying October sales and orders.

Because of strikes and other factors that tended to distort the picture, many businessmen took a look at October production rates and began talking about a leveling off.

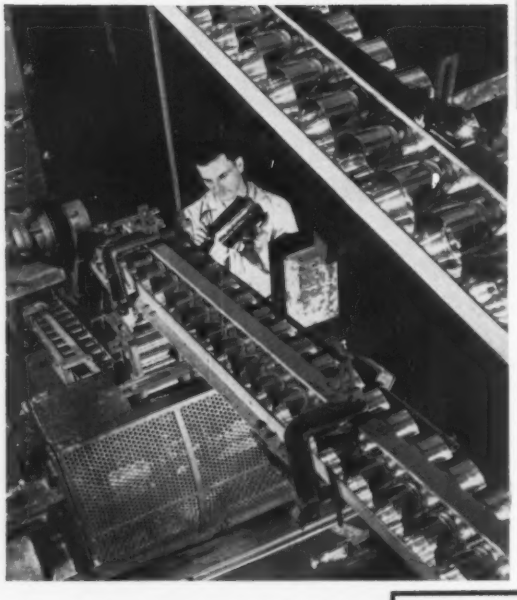
It's significant to note, however, that new orders placed with manufacturers continued to gain more than seasonally during the month. This should mean a significant jump in production indexes.

The Figures — Dept. of Commerce figures show new orders for all manufacturing jumped to $27.8 billion in October from $27 billion in September. This compares with $26.1 billion in August, when the upturn was just gaining headway. In October a year ago, new orders hit only $26.7 billion.

Almost all of the gain took place in the durable goods industries. It was centered in transportation equipment, with some gain in nonferrous metals and building materials. Electrical and non-electrical machinery industries dropped.

Sales Up Too—These figures are seasonally adjusted and reflect "more than seasonal gains." Unadjusted, new orders rose to $28.6 billion in October from $26.8 billion in September.

Sales also continued to gain during the month. Backlogs were virtually unchanged, however, and inventories held about even. In spite of apparent efforts on the part of purchasers to build up their stocks, durable goods manufacturers' inventories dropped about $100 million in the month, an increase that was offset by a decline in nondurable producers' stocks.



IBM improves its paint finishing using sprayed textured vinyl

Unichrome Coating 6400, a new, spray applied, textured vinyl finish, has greatly improved the quality of machine covers for IBM's Data Processing equipment. It provides much longer life in service due to its increased scratch and mar resistance. Rejects from in-transit damage and material handling have been sharply reduced. Savings, particularly in refinishing, have been accomplished by these improved physical properties.

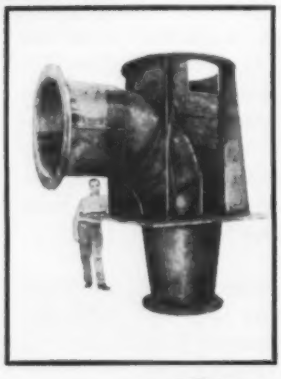
Available in a variety of colors, Unichrome Coating 6400 delivers a handsome leather-like finish with less complications and cost than obtained by use of laminated vinyl.

Films range from 8 to 20 mils in thickness and will outwear ordinary textured enamels by 10 to 1. Send for bulletin.

Tin cuts costs and contamination

Steel manufacturers each year produce enough "tin strip"—sheet steel continuously plated with a thin coating of tin—to provide 40 billion cans. The food industry alone spends some $45 million for the familiar containers. Why *tin?* It's one of the few practical metals that's non-toxic and a corrosion preventive. Most of the tin plate produced in this country is plated at high speed and low cost with stannous chloride, a unique plating chemical developed by Metal & Thermit, first name in tin and tin chemicals.

Photo courtesy of American Can Company



Welded pump elbow handles 2,000,000 gals. an hour

For such high capacity and big as it is, this pump section has to be dependably strong. That's why Murex electrodes were used exclusively in welding the half-inch thick plates. These electrodes produce uniform welds free of porosity—even over any possible gaps in the fit-up—with more than enough strength for the tremendous hydraulic forces the pump will develop. Built by Viking Metal Fabricators, Inc., this elbow section stands 10 feet high, has a 42-inch O.D. Bulletin ESC describes M&T welding line.

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Will Turbines Make the Grade?

New Engine Design Could Be in Production by 1965

Major technical problems involved in a gas turbine engine have been solved.

But auto companies appear reluctant to adopt this new principle.—By H. R. Neal.

▪ Are automakers dragging their feet in developing a production model gas turbine passenger car? A University of Michigan engineer believes they are.

Prof. Frank L. Schwartz told members of the American Society of Mechanical Engineers, conventioning in New York, auto companies could mass produce a gas turbine-powered vehicle by 1965—"if they so desired."

Technical Bugs Ironed Out—"Various manufacturers in both the U. S. and England have predicted the appearance of production models in anywhere from two to seven years," he pointed out. "The technical problems of producing an efficient gas turbine are solved. The major problems yet to solve are those of reducing costs and of manufacture, as well as the designing of a chassis and body specifically for the gas turbine."

The ability of a simple gas turbine to economically compete with reciprocating engines becomes more evident as horsepower increases. More powerful gasoline engines require higher compression ratios, higher octane fuels, and expensive fuel injection systems.

In Comparison—The gas turbine engine, he said, would likely be no larger than present engines. Its fuel consumption would be equal or better, it would use less lubricating oil, and would burn either kerosene or fuel oil. In addition, it wouldn't require anti-freeze and maintenance costs would be lower because of its few parts.

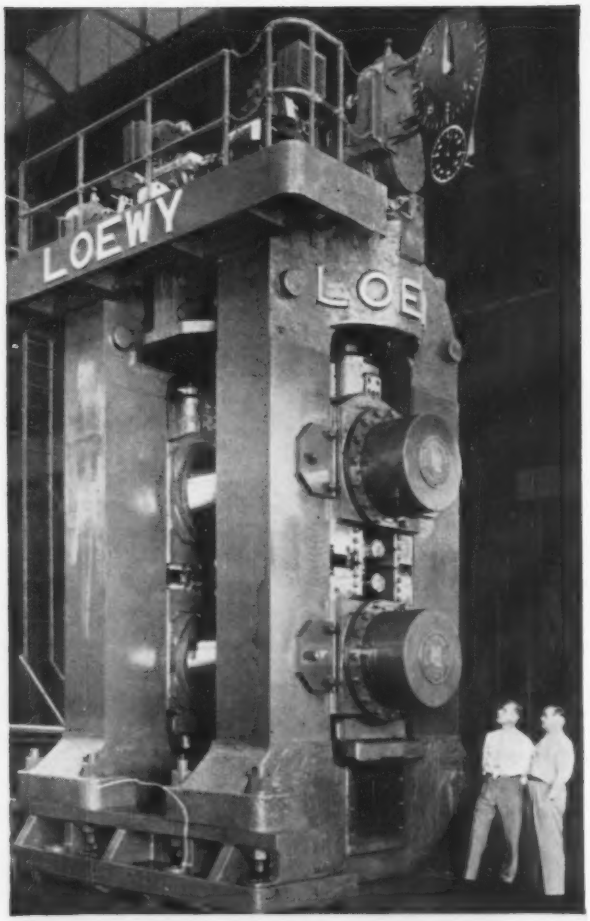
"It is expected the maintenance of an automotive gas turbine will be less than of present reciprocating engines," the U. of M. engineer said. "At least, that is the experience in all applications of gas turbines, whether it is aircraft, pipe line pumping, production of electrical energy, or main use. Turbine wheels could well have a life of 100,000 miles and be replaced at that time with less difficulty than putting new rings into a reciprocating engine.

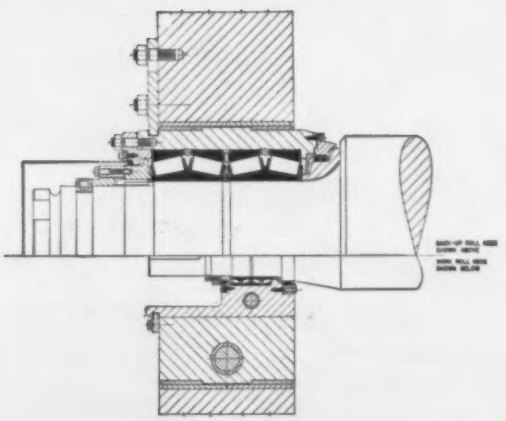
Need for Low Cost—"However," Prof. Schwartz said, "if gas turbines are to be competitive with reciprocating engines, they not only must have equal or better performance, but they must be made at as low a cost or lower than reciprocating engines. Therefore, it is very likely the first production models will be in the low priced, high production automobile.

One factor affecting the competitive position of mass production passenger car turbines is construction of a heat exchange to pre-heat incoming air before it enters the combustion chamber. This is a must

Better Than Riding Horseback

DE SOTO'S FINEST: The 1959 De Soto Adventurer, a limited production prestige car, is equipped with a 350-hp engine and swivel seats. Rider portrays Hernando De Soto, who brought first horse to North America.





How **LOEWY-HYDROPRESS** mounts rolls of this 12 x 43 x 42 mill on Timken bearings to take shocks, assure longest, most economical life.

Rolls up to 20″ x 20″ the "hard" way... Timken® bearings take the shock

THIS powerful 4 Hi reversing mill, built by Loewy-Hydropress Division of Baldwin-Lima-Hamilton Corp., is doing its job the "hard" way—rolling small slab ingots of special hard alloys up to 20″ x 20″. To roll them down to .010″ or less takes a lot of force. It's hard work. This mill operates at a separating force of 140,000 lb. per inch of width—at speeds from 75 to 200 fpm. To take the heavy shocks, keep bearing cost down, Timken® tapered roller bearings are used to mount the back-up and work rolls, screwdown drive and screwdown worm gear. 24 Timken bearings all told.

Here are the big reasons why 1008 steel mills use Timken tapered roller bearings on roll necks:

1. Longer life. Tonnage records show that the long life of Timken roll neck bearings keeps bearing cost per ton of steel rolled at rock bottom. **2. Better mill rigidity.** Balanced proportion design of Timken bearings permits larger roll necks than ever before possible with tapered roller bearings. Load ratings are increased up to 40% due to Timken bearings' balanced proportion design. **3. Simplified lubrication.** No complicated systems; Timken bearings permit use of simple grease lubrication. **4. No special thrust bearings needed.** Timken bearings take *both* radial and thrust loads. **5. Steel loss ended in mill stops and starts.** Timken bearings permit starting under full loads. **6. Faster mill rolling speeds** because Timken bearings minimize friction.

Timken bearings make any machine better. And better machines make better products. That's Better-ness. And the trade-mark "TIMKEN" is your symbol of Better-ness. Look for it. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

BETTER-ness rolls on **TIMKEN**® tapered roller bearings

Automotive Production

WEEK ENDING	CARS	TRUCKS
Dec. 6, 1958	147,490	23,375
Nov. 29, 1958	123,088	20,619
Dec. 7, 1957	139,597	22,636
Nov. 30, 1957	114,795	17,312
TO DATE 1958	3,797,564	798,643
TO DATE 1957	5,720,343	1,021,465

*Preliminary Source: Ward's Reports

for engine efficiency, according to turbine engineers.

A Possibility—Rotary heat exchangers are getting a lot of attention, Prof. Schwartz said. But this type presents problems in development of seals with low leakage losses and long life. He indicated, though, that one organization reports it has developed seals which have longer life than other parts of the gas turbine.

Auto Output Hits 1958 Peak

November auto production reached the highest level of the year and, for all but one manufacturer, it marked the best performance of the year.

Output for the month was 514,099 units, nearly double the figure 261,696 vehicles manufactured in October, when production was slowed by strikes and new model start-ups, according to the latest figures from the Automobile Manufacturers Association.

Less Than Hoped For — Total U. S. passenger car production for the first 11 months was 3,647,879, almost two million units behind the 1957 total of 5,581,390 units produced during the same period.

Even if the industry attains its goal of 600,000 units this month, which seems unlikely, total output for the year will fall short of the 4.34 million units produced in 1952. This year's auto production is destined to win a place just ahead of 1948 when 3.91 million cars were made.

Upturn Begins—But production is picking up. General Motors was the only automaker whose November production wasn't the best month of the year. However, its 255,536 units were only about 20,000 fewer than January, GM's best month. The company should have little trouble beating January this month.

Oldsmobile, claiming a 41,000 unit sales lead over its nearest rival, Buick, expects to end up the year in fourth place in the industry and first place among the medium-price set.

Lots of Overtime — Ford's outpouring of 158,810 units was its best showing since November, 1957. Production schedules of several divisions have received last minute upward revisions. Ford Div., already on heavy overtime schedules calling for 9- and 10-hour days and six-day weeks, has boosted its schedules another 5 pct for December. The division says its workers will earn $7 million in overtime pay for the month by Christmas.

Edsel schedules have received a 40 pct increase to a planned 7700 units. In order to accomplish this, it is taking over passenger car assembly facilities now shared with Ford Div. in Louisville, Ky. Mercury's four assembly plants and station wagon body plant have scheduled overtime for this month.

Chrysler Corp., despite strikes, saw its production during the month climb to 62,944 units. Although still faced with strike threats, the company should be able to improve on the November figure.

AMC Keeps Climbing — American Motors production record inched a little higher again last month. AMC's output of 26,571 units was a slight improvement on the previous all-time record of 26,124 set in October.

Studebaker produced 10,238 units, mostly its new Lark series, during the month despite a three-day strike of its workers. The one-month output is equal to 25 pct of its entire 11 months' production. Overtime has been scheduled for December in an attempt to catch up with its dealer orders.

The Bull of the Woods

ALL RIGHT! YOU PULLED ME OUT OF TH' MACHINE AND YOU'RE A HERO-- BUT DON'T HOLD ME UP ALL DAY ADVERTISIN' IT!
YOU CAN'T BLAME TH' GUY--HE GOT HIM OUT OF IT BEFORE ANYBODY COULD SEE IT!
YOU'RE NEVER A HERO TO A GUY YOU SAVE--YOU MAKE HIM LOOK TOO MUCH LIKE A FAT-HEAD!
THE PICTURE HANGER
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Tough Labor Laws Unlikely in '59

Congress Will Sidestep Strong Reform Action

Don't expect any drastic reform moves when pro-labor Congress meets in January.

There's little chance of action to curb abuses of secondary boycotts.

Here's what new labor laws may include and what they may omit.—By G. H. Baker.

▪ Labor reform—at least in any meaningful form—won't come in 1959. What we'll probably get is the slap-on-the-wrist type of "reform" such as that backed this year by Senators Kennedy and Ives, and the AFL-CIO.

Almost every Senate and House member will tell you privately he'd "like to vote" for cleaner labor-management relations. "But what can you do?" they shrug. "We're not going to bust up the labor movement just to catch a few crooks."

Management Guilt — The sad truth is that top management in many firms is not anxious for reform because of questionable deals they've entered into with some labor bosses. Example: Records of the McClellan (Senate) investigating committee disclose embarrassing examples of management officials who made deals with James Hoffa (and other officials of the AFL-CIO Teamsters) for the purpose of crippling their competitors.

Boycotts Immune—One area that cries out for reform is the weakness of the Taft-Hartley law that permits secondary boycotts. Again, most congressmen will tell you privately of their shock and distress at seeing innocent firms hurt and even driven out of business because of secondary boycotts against them. But there is little evidence that the new Senate and House will have the political courage to pick up this hot potato and dispose of it.

Secondary boycotts are a very effective weapon of the unions. Balky firms can be brought to their knees quickly when faced with lost sales and shutdowns. But the pro-labor character of the new Congress precludes any possibility of correction here. Ike probably will ask Congress to clean up this area —to no avail.

What to Expect—Here's about what we can expect in the way of a new labor law:

Management will be forbidden to raise wages when unions are trying to organize workers. Unions and management will be relieved of filing non-Communist affidavits. Unions will be required to file some public reports on their finances. Management will be required to file reports on funds involving union money.

What Not to Expect—And here's what should be—but probably won't be—in a new labor law:

A ban on secondary boycotts. An honest count of ballots in union elections. Permission for union members to look at the union's financial records. Fiduciary responsibility on union officials regarding union funds.

Debate on A-Powered Carrier

▪ Navy adherents are looking hopefully to Defense Secretary McElroy for backing in their bid for another atomic-powered aircraft carrier.

The Navy and its supporters would like the new Congress to vote funds for a sister ship to the still-building Enterprise. This huge vessel, rated at 85,000 tons, is scheduled for launching in mid-1960. It will require another year or so to outfit the carrier for sea duty.

Help Needed—By the time the Enterprise is completed, its cost will be close to $375 million. This whopping sum will weigh heavily against approval of money for a companion ship — unless such Eisenhower Administration stalwarts as Secretary McElroy convince Congress of the need for it.

The Pentagon boss has not indicated any change in his views on the necessity for a strong sea service. Proponents of an expanded nuclear carrier force are encouraged, reasoning that more vessels of this type would be integral to sea-lane protection.

Secretary McElroy may not reveal before the first of the year whether there will be a strenuous campaign for funds for another carrier. Meanwhile, Navy carrier enthusiasts will prepare to state their cases in support of his possible sponsorship of the money request.

(Advertisement)

SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER I—Decorative, Corrosion-Resistant Finishing with Iridite

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a decorative finish or a good paint base for non-ferrous metals. However, continued developments are so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can combine salable appearance with durability in one finish at a competitive price advantage. Report II on paint base, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, as a basis for this discussion, a "decorative" finish is considered as any chromate film that is used as a final finish in itself. It may be truly decorative in that its sole purpose is to enhance the beauty of the product. For example, a bright chrome-like finish or a pleasing bronze appearance are among the many effects that can be obtained. It may be functionally decorative in that it reduces reflectivity for camouflage purposes or provides a means of color-coding parts. But, in all cases, the Iridite films protect the metal against corrosive attack.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. These films can produce a wide variety of pleasing appearances. The basic colors of the Iridite coatings are grouped below by metals.

ZINC and CADMIUM: Metallic bright, light iridescent, iridescent yellow, bronze, olive drab.

COPPER, BRASS, BRONZE: Metallic bright, yellow.

ALUMINUM ALLOYS: Clear, iridescent yellow, brown.

MAGNESIUM ALLOYS: Light brown, dark brown, black.

SILVER: Metallic bright.

In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

Depending upon the metal and the Iridite used, corrosion resistance of clear and bright films ranges from mild passivity to as high as 500 hours in salt-spray; on heavier dark films, salt-spray resistance ranges from approximately 100 to 1000 hours.

It is this combination of decorative and corrosion resistant properties that accounts for the widening use of Iridite finishes. For example, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, a combination of lustrous chemical polishing of the as-cast surface of zinc die castings and good resistance to corrosion. Further, in many cases, sizeable savings in the cost of buffing and electroplating are realized.

WHAT IS IRIDITE®

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

On many steel parts, a simple system of zinc or cadmium plate and bright Iridite is used instead of more costly electroplated finishes to provide a bright, decorative and protective finish with tremendous savings in material, equipment and labor.

In finishing aluminum, where corrosion resistance or paint adherence is the prime consideration, the aircraft industry has all but abandoned the anodizing process in favor of recently developed chromate conversion coatings, among them Iridite #14 and #14-2 (Al-Coat). These formulations and their method of application can be varied to retain the original metallic appearance while providing acceptable corrosion resistance, or to produce a fully colored brown finish that offers exceptional corrosion protection. Again, time and manpower savings are astounding—one company saved at least $15,000 a year on maintenance of racks alone and another $40,000 on materials and labor in only nine months. In addition, of course, hundreds of thousands of dollars are saved by eliminating the need for expenditures for generators, heating equipment and racks.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to having decorative and protective functions, these chromate coatings form an excellent base for organic finishes and bonding compounds. They have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 E. Monument Street, Baltimore 5, Maryland.

Blueprint of New Farwest Boom

Population Gains Will Push Coming Upsurge

By 1970 West Coast manufacturers may have doubled their present labor force of 1.2 million workers.

Gains forecast for metals, machinery, fabricating, and aircraft.—By R. R. Kay.

▪ There's a brand new boom brewing in California. In fact it's already in the making.

Here's a blueprint of what's ahead:

Manufacturing industries, by 1970, will show giant employment gains. They'll double today's 1.2 million workers.

Gains for Metals—Leading industries in this gain will be machinery, metals, and fabrication. And there's a good chance that these will have about two and a half times as many workers as they have today.

Transportation equipment makers will also do well. More persons will find jobs in plants assembling automobiles and in making aircraft, missiles, ships, and freight cars.

Westward March—Behind it all is relentless population move to the West. Right now there are 15 million Californians. That's 5 million more than a decade ago.

California could overtake New York by 1965. It fully expects another 5 million people by then. There will be jobs for them. In fact, it's quite likely that by 1970 the state will be labor-short.

Bernard E. Etcheverry, Kaiser Steel's director of general planning, makes those observations. They're based on an exhaustive study made by a key California state agency. This not-yet-released employment outlook report takes a hard-headed look at California's future.

Things to Come—By 1970 you may see:

An 85 pct rise in production of goods and services.

A 200 pct increase in electric power needs; a 108 pct boost for natural gas; a 77 pct hike in gasoline use; and a 63 pct gain for petroleum.

Spendable income will grow faster than population with the total up almost 65 pct.

Industrial and government employment figure in the upcoming boom. Both will keep pace by adding more workers.

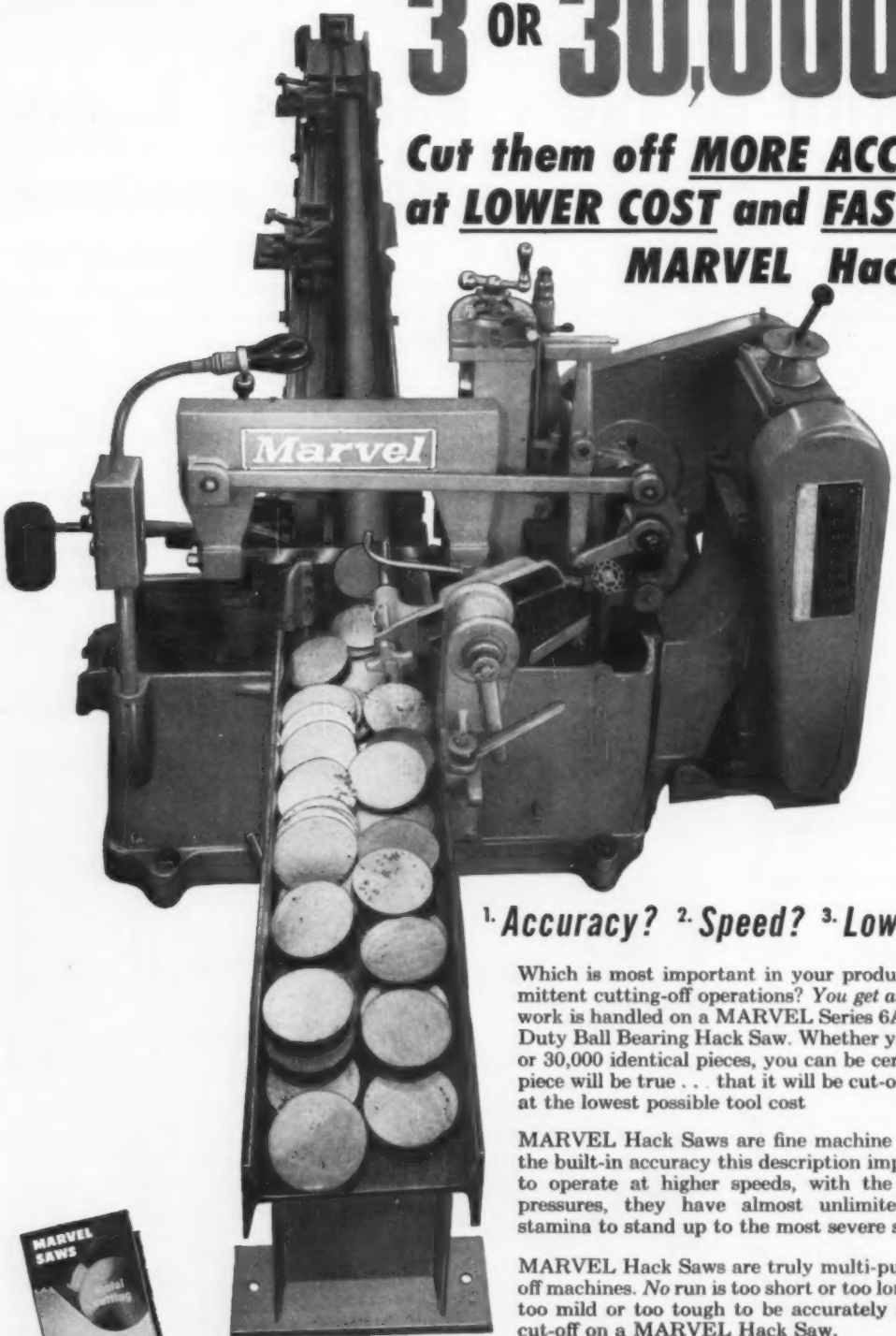
California's rising star on the national political scene will be a factor, too. It certainly won't hurt the state's chances for more government projects.

Mail-Pouch System Speeds Freight

FAST TRANSFER: During stop-over for freight transfer, one pallet was quickly substituted for another in twenty minutes with new Lockheed aircraft system. Formerly same loading switch required four hours.

3 OR 30,000 PIECES

Cut them off MORE ACCURATELY at LOWER COST and FASTER on a MARVEL Hack Saw



1. Accuracy? 2. Speed? 3. Low Cost?

Which is most important in your production or intermittent cutting-off operations? *You get all 3* when your work is handled on a MARVEL Series 6A or 9A Heavy Duty Ball Bearing Hack Saw. Whether you're cutting 3 or 30,000 identical pieces, you can be certain that each piece will be true . . . that it will be cut-off quickly, and at the lowest possible tool cost

MARVEL Hack Saws are fine machine tools, with all the built-in accuracy this description implies. Designed to operate at higher speeds, with the heaviest feed pressures, they have almost unlimited power and stamina to stand up to the most severe service.

MARVEL Hack Saws are truly multi-purpose cutting-off machines. *No* run is too short or too long, *no* material too mild or too tough to be accurately and efficiently cut-off on a MARVEL Hack Saw.

Catalog C56 has complete details, facts and figures on MARVEL Metal Cutting Saws. Write for it today.

S-1306

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MARVEL *Metal Cutting* SAWS
Better Machines–Better Blades

How to Avoid Tapping Problems

Find a Tap that Suits You (They're Not All Alike)

Here are a few tips from engineers on how to keep your tapping operations up to par.

Taps are different and it pays off to find one that fits your job. —By E. J. Egan, Jr.

▪ You're far from being alone if your precision tapping operations get fouled up from time to time. Nor should you hop into the dunce's chair whenever it happens.

Everyone hits these snags, say engineers at Henry P. Boggis & Co., Cleveland builder of tap grinders. In their opinion, although taps are among the most commonly used cutting tools, they also stand unchallenged as the least understood.

Few Rules to Follow — Boggis experts say there aren't any firm rules for precision tapping; what works well on one job may not work on another. You have to experiment. But you can do it systematically; they suggest a two-step approach to help you stay out of trouble.

They recommend you first find the make (they're not all alike) and style of tap which seems to work best on a specific job. Next, experiment with the grind until you get the best possible results.

They Are Different—Are there differences in standard, stock taps made by various firms? Boggis experts say it's true enough that all tap makers hold such factors as pitch diameter, thread form and lead to standard tolerances. But they grind chamfer relief, chamfer angles, flute forms and spiral points to their own specifications.

So identical appearance in different makes of taps doesn't count. You should seek one whose "hidden" differences make it best for your job.

Keep Sharp—Once you've found the tap—with or without a modified grind—that produces consistently good threads, the advice is to keep it sharp. Run it beyond the resharpening time, the Boggis firm says, and the inevitable happens—a flock of tap and tap-hole problems.

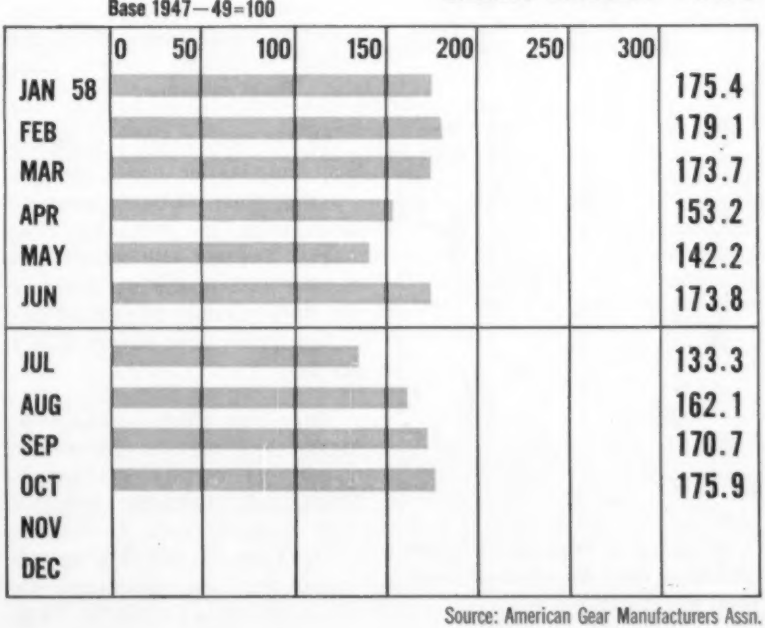
Brown & Sharpe Covers Its Market

Brown & Sharpe Mfg. Co. went a few steps beyond the usual home office demonstration in announcing a new machine tool recently.

Adapting the auto industry's mass-demonstration technique, the firm simultaneously unveiled models of its new Micromaster surface grinder in 20 states, as well as in Canada. Same-day demonstrations for prospective customers were held in the firm's district sales offices and in the showrooms of the company's dealers and agents.

Company officials designed the new technique to shorten the time lag between announcement of a new machine and its availability in the field. Prior to announcement day, the company brought its district sales managers, agents, and dealers to the Providence, R. I., plant for a three-day seminar to acquaint them with features of the new grinder.

GEAR INDEX 1958



Source: American Gear Manufacturers Assn.

INDUSTRIAL BRIEFS

Onward and Upward — A new technical society, to meet some of the requirements of the space age, is being formed on the East Coast. New unit is called the Society of Aircraft Materials and Process Engineers (SAMPE) Eastern Div. Persons interested should contact Allegheny Ludlum Steel Corp., Bell Bldg., Tarentum, Pa.

Campus View—Hans Ernst, internationally-known research engineer, has been appointed Herman Schneider research professor in the College of Engineering, University of Cincinnati. Mr. Ernst was director of research for The Cincinnati Milling Machine Co., Cincinnati, O.

Prelude to Space—Solar Aircraft Co. will build a 60,000 sq ft engineering and research building and a huge furnace for heat treating and brazing missile components. It will be built on Solar's bayfront leasehold in San Diego, Calif.

Subs Need Spares—The electric Storage Battery Co. has a $4.5 million order from the U. S. Navy for submarine batteries for fleet replacement purposes. The batteries will be manufactured by the Industrial Div. in its Philadelphia plant.

"I started in business to be my own boss, but I forgot about Uncle Sam, labor, and my wife. . . ."

Now Casting—Hinges — At its Defiance, Ohio, plant, Central Foundry Div. of General Motors is currently casting over a million automotive front door hinges per month of malleable iron. Used on all '59 GM passenger cars, the malleable iron hinges have replaced hinges which were previously made of rolled steel sections.

Two Cans in One—Continental Can Co.'s two subsidiaries in Canada, Gair Co. Canada Ltd. and Continental Can Co. of Canada, Ltd., will be merged January 1, 1959. They will operate under the name Continental Can Co. of Canada, Ltd. The consolidated company will operate as an independent enterprise.

Call to Duty — Charles Paul Grisell, manager, engineering and development, Power Piping and Sprinkler Div., Blaw-Knox Co., has been named assistant director, Power Equipment Div., Business and Defense Services Administration, U. S. Department of Commerce.

Spot on the Seine—The Budd Co., Philadelphia, has a new subsidiary, Bufra (Budd/France), with headquarters in Paris. Bufra will market in Western Europe a line of testing processes and machines being developed and produced by Tatnall Measuring Systems Co., also a Budd subsidiary.

All for Ore—Jones & Laughlin Steel Corp. is building a new ore sintering plant and ore screening facilities at its Aliquippa, Pa., Works. The unit will increase blast furnace performance by about 20 pct. It will produce 90 railroad cars of high quality blast furnace burden per day.

Three-Year Hitch — George W. Mork, chief engineer - commercial cranes and excavators, Bucyrus-Erie Co., S. Milwaukee, Wis., has been appointed to a 3-year term on the Technical Board of the Society of Automotive Engineers, Inc. His term will begin Jan. 1, 1959.

Power for Listerhill—An order in excess of $3 million received by Westinghouse Electric Corp., will furnish motor and control equipment to drive a new aluminum strip mill now being built by Reynolds Metals Co., at Listerhill, Ala. Equipment is being made at Westinghouse plants in E. Pittsburgh, and Buffalo, N. Y.

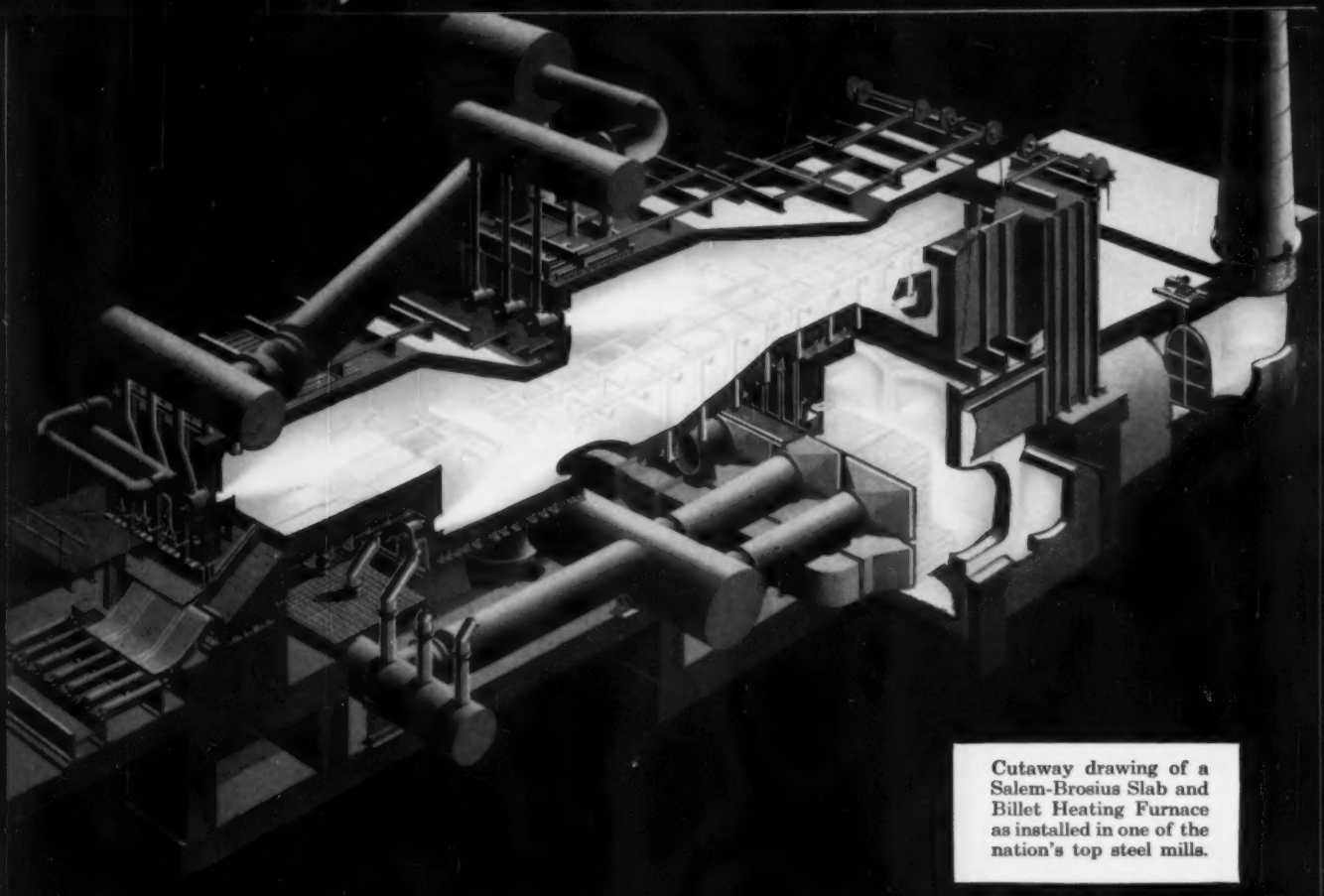
Two New, One Holdover—J. K. Hodgson, secretary, Hodgson Foundry Co., Chicago, has been elected president of The Chicago Foundrymen's Association. H. R. Erickson was re-elected vice president, and H. J. Leddy, elected secretary-treasurer.

Missile Senses—The Electro Mechanical Instrument Div., Consolidated Electrodynamics Corp., Pasadena, Calif., has a $130,000 order from Douglas Aircraft Co. for electrical connectors to be used in telemetering and guidance equipment Douglas is building for the U. S. Army Ordnance Nike-Hercules program.

From A to U—Union Carbide Corp. has exercised its option to buy from Amoco Chemicals Corp. the facilities on the 306 acre tract at Brownsville, Tex., site of the processing plant formerly operated by Amoco. Option includes the 42-mile Weslaco - Brownsville natural gas pipeline.

Added Talent — Solar Chicago, Division of U. S. Industries, Inc., is the new name for Chicago Steel Tank Co., division of U. S. Industries. The name formerly referred specifically to just one product line. It now makes all sorts of processing equipment and special vessels for many industries.

Action in Coke Ovens—Allied Chemical's Wilputte Coke Oven Div. has a contract from Jones & Laughlin Steel Corp. for the engineering and construction of 59 coke ovens at J&L Pittsburgh Works. Project is estimated by J&L to cost about $6 million. It is part of an overall replacement and modernization program.



Cutaway drawing of a Salem-Brosius Slab and Billet Heating Furnace as installed in one of the nation's top steel mills.

In this Salem-Brosius furnace better steel products are born

All over the country, steel producers are turning to Salem-Brosius Pusher-Type Slab and Billet Heaters, because they have come to know that these furnaces will produce maximum tonnages of evenly heated, accurately temperatured steel at the lowest fuel consumption rate. The triple-fired furnace shown above features accurately controlled heating and soaking zones, heavy construction, recuperators for fuel economy, dual gas-oil fuel system, low maintenance cost, and many other advantages. These assure positive, automatic control of furnace output and heating quality.

And the efficiency, economy, ease-of-operation, and trouble-free service this furnace affords are typical of all the furnaces Salem-Brosius builds. Whether you require this or any other heating or heat treating furnace, Salem-Brosius offers equipment designed, engineered, and built not merely as a furnace but as a heating machine. You can purchase these furnaces as complete installations—equipped with all controls, piping and wiring—ready to operate. Write to us.

SALEM-BROSIUS, INC.

CARNEGIE, PENNSYLVANIA

In Canada: Salem Engineering Limited • 1525 Bloor Street West, Toronto 9, Ontario

SPECIAL MECHANICAL EQUIPMENT • INDUSTRIAL HEATING FURNACES • MATERIALS HANDLING EQUIPMENT

J. D. Williams, elected president, Lipe-Rollway Corp. and Rollway Bearing Co., Inc., Syracuse, N. Y.

J. M. Knox, elected president, Research - Cottrell, Inc., Bound Brook, N. J.

H. A. Correa, elected vice president, marketing, ACF Industries, Inc.

L. P. Thomas, appointed president, Peerless Equipment Div., Poor & Co., Chicago.

H. L. Rodgers, Jr., appointed vice president, Titanium Fabricators, Inc., Burbank, Calif.

R. C. Barkley, elected chairman of the board and **E. J. Fitzgerald, Jr.,** elected president and general manager, The Cameron & Barkley Co.

R. C. Rieder, elected vice president, manufacturing, Baker Perkins, Inc., Saginaw, Mich.

P. B. McSherry, Jr., appointed vice president, sales, Parker-Kalon Div., General American Transportation Corp.

W. L. Smith, appointed assistant to the president, Chase Brass & Copper Co., Waterbury, Conn.; **G. R. Boutin,** named vice president, operations.

W. J. Patterson, appointed comptroller, Ford Instrument Co., Div. of Sperry Rand Corp.

J. H. Felt, appointed secretary, Acme Steel Co., Chicago.

C. H. Mawhinney, promoted to assistant to vice president, commercial, Jessop Steel Co., Washington, Pa.

H. E. Barnum, appointed assistant manager, Foundry Div., Vanadium Corp. of America, New York.

R. G. Allen, elected president, Bucyrus-Erie Co., S. Milwaukee, Wis.

W. T. Burns, appointed works manager, Kaiser Chemicals' Moss Landing, California plants, Kaiser Aluminum & Chemical Corp.

C. R. Slater, promoted to manager, Melrose Park (Ill.) Works, National Malleable & Steel Castings Co., Cleveland.

P. H. Girouard, promoted to development coordinator, Consolidated Electrodynamics Corp., Pasadena, Calif.; **H. S. Black,** appointed director, DataTape Div.

G. H. Van Schaik, named manager, Chicago district office, Whiting Corp., Harvey, Ill.; **Harrison Taylor,** named manager, St. Louis district office; **R. J. Enroth** and

H. F. Hodgkins, Sr., becomes chairman of the board, Lipe-Rollway Corp. and Rollway Bearing Co., Inc., Syracuse, N. Y.

E. C. Peterson, elected to the board of directors, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

V. E. Gumbleton, appointed vice president and purchasing coordinator, Rockwell - Standard Corp., Coraopolis, Pa.

Bruce Elmblad, have joined the sales staff, Chicago and New York district offices, respectively.

N. T. Wonsetler, named production manager and **H. P. Crowley,** named superintendent, Departments "E" and "S," Truscon Div., Republic Steel Corp., Youngstown, O.

W. S. Bliss, elected vice president, marketing, Vulcan-Kidd Steel Div., H. K. Porter Co., Inc., Aliquippa, Pa.

I. G. Kepner, named Pacific Coast region manager, distributor and apparatus sales, San Francisco headquarters, Linde Co., Div. of Union Carbide Corp.

L. C. Gleason, elected president, Gleason Works, Rochester, N. Y.

P. F. Matheny, appointed supervisor, systems projects, Crucible Steel Co.'s Systems and Procedures Dept., Pittsburgh.

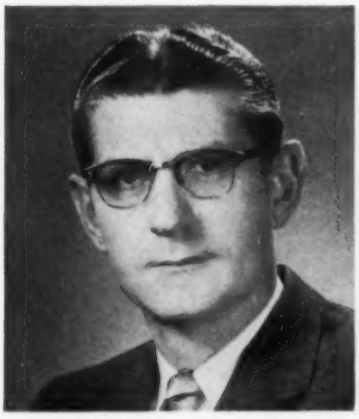
R. M. Kilgore, named district sales manager, New York office, National Steel Corp., Pittsburgh.

R. F. Hodgson, appointed general sales manager, Hydreco Div., The New York Air Brake Co., Kalamazoo, Mich.

H. V. McGuire, appointed assistant to the sales manager, Enthone, Inc., New Haven, Conn.

W. C. Hanna, becomes field sales manager and **L. M. Huston,** named sales service manager, Superior Tube Co., Norristown, Pa.

L. M. Littmann, appointed manager, distributor and engineering product sales, New York, Allis-Chalmers International.



E. F. Andrews, appointed assistant to the vice president, purchases, Allegheny Ludlum Steel Corp., Pittsburgh.

J. H. Ingalls, appointed field service engineer, Boston Div., A. M. Byers Co.

J. H. Rolfe, appointed warehouse manager, Toledo, O., Crucible Steel Co. of America.

C. E. Griese, appointed general sales manager, Ohio Hoist Mfg. Co., Lisbon, O.

H. H. Sonderegger, appointed director, engineering and research, Gifford-Wood Co., Hudson, N. Y.

E. A. Loria, appointed product metallurgical engineer, Crucible

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MORE RIDES

Malleabrasive goes for "more rides"—retains its grade particle size longer—has longer cleaning life, because of its own exclusive metallurgical structure—found in no other metal abrasive.

Tough and shatter-resistant, its slow breakdown rate prevents the excessively fast accumulation of "fines" that slow up cleaning, destroy machine replacement parts and build up cleaning costs.

Yes, cleaning costs are lower with Malleabrasive—proven in plant after plant. We'll show you why—cite you cases. Write us.

NOW IN 50 LB. BAGS

THE GLOBE STEEL ABRASIVE CO.
Mansfield, Ohio

Sold by Pangborn Corp., Hagerstown, Md., and by many leading distributors of foundry supplies from coast to coast.

Up in the air over a consistent melt quality?

Junior's out to prove he's handy at hooky! He's hidden behind the homestead—but those buoyant bubbles are making the rounds! This is one peace pipe that's going to open hostilities!

THEN IT'S NO TIME FOR PIPE DREAMS . . . not when uniformity of quality counts! That's when you turn to Keokuk Silvery Pig Iron, the superior form of silicon introduction—famous for its unvarying uniformity of results. Handle by magnet, furnace-charge by weight, or count the pigs for equal accuracy. For Aluminum producing, it's Keokuk Silicon Metal. Nothing finer!

Keokuk Electro-Metals Company Keokuk, Iowa;
Wenatchee Division, Wenatchee, Washington

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SILICON METAL—OTHER FERROALLOYS

When you think of SILICON think of KEOKUK!

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Keokuk Silvery Pig—the superior form of silicon introduction—is available in 60 and 30 lb. pigs and 12½ lb. piglets in standard analysis or alloyed to your specifications. Silicon metal and ferrosilicon are supplied in standard sizes and analyses.

Steel Co.'s Customer Technical Service section, Pittsburgh.

J. P. Vaughn, promoted to Los Angeles district sales manager, Voi-Shan Mfg. Co., a division of Pheoll Mfg. Co.

A. C. Bennett, appointed plant manager, Paper Machine Div., The Black - Clawson Co., Watertown, N. Y.

V. H. Patterson, appointed metallurgical engineer, Chicago headquarters, Vanadium Corp. of America, New York.

I. R. Spangler, appointed sales manager, Machine and Tools Div., Michigan Tool Co., Detroit.

OBITUARIES

E. B. Gleason, 55, president, Gleason Works, Rochester, N. Y.

N. T. Olsen, vice president and president, Peerless Equipment Div., Poor & Co., Chicago.

R. A. Gillies, vice president, operations, The Steel Co. of Canada, Ltd., Hamilton, Canada.

A MOMENT WITH MANAGEMENT...

HERE'S HOW: The Production Manager can Increase the Profit Margin!

No one consciously cuts profits by spending man-hours and machine time on materials headed for the scrap heap. This is something that "just happens."

Testing is one of the best new tools for the production man—a low-cost way of preventing waste. Early detection of all parts headed for the scrap heap enables you to take corrective action *before* additional machining costs are invested.

Such testing is a new tool that offers immediate savings and future savings as well.

At a cost of only a few hundred dollars, many plants (large and small) now save thousands of dollars per month.

Magnaflux provides these tools. Effective, low-cost test methods eliminate wasted production effort and permit holding consistent quality standards at any level you establish. These benefits provide a higher profit percentage. Or, if you prefer, a better product at a lower price.

Can you afford to overlook these benefits? Write today for a free copy of "Lower Manufacturing Costs," an informative booklet. Or, ask our Field Engineer to discuss where and how low-cost Magnaflux Test Systems have helped others increase plant productivity.

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BUSINESS IS UNUSUALLY COMPETITIVE TODAY AS OPERATING COSTS ARE RISING AND PROFITS SHRINKING

Did you ever meet a vendor who wouldn't sell you the equipment you wanted?

Just "meeting" such a vendor is not enough.

If you haven't *always had* vendors who refuse to supply unsuitable equipment, you've been getting something you don't need.

If you haven't *always had* vendors who are dedicated to advancing your manufacturing technology, you're getting less than you *must* have.

Your responsibility for devising production processes and selecting equipment is greater than ever. You no longer have time to "hand-feed" any equipment builder's design and manufacturing operations.

Yet, you can't afford to install anything other than what is right. Because, if your production methods aren't keeping pace with your competitors', you're already starting to go out of business.

Sciaky knows these facts of business life. To Sciaky, it is obvious that the cost of always having to make *new sales to new customers* is far greater than the cost of a long term relationship of trust based on fulfilling your requirements. That's why Sciaky refuses to sell resistance welding and production equipment which is unsuitable for the user's needs.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you are considering equipment. No obligation, of course.

Many manufacturers are taking that advantage. As a result, men just like you are enjoying the full vendor support necessary to steadily improving their company's manufacturing operations. When Sciaky analysis of their requirements sometimes indicates that Sciaky equipment is not suitable, the recommendation for "no change" is immediate. Thus, Sciaky builds the foundation of trust necessary to your success.

The bulletin, "Resistance Welding At Work" contains many factual descriptions of interesting applications of the Sciaky technique. Write and advise of your field of interest.

SCIAKY

67A

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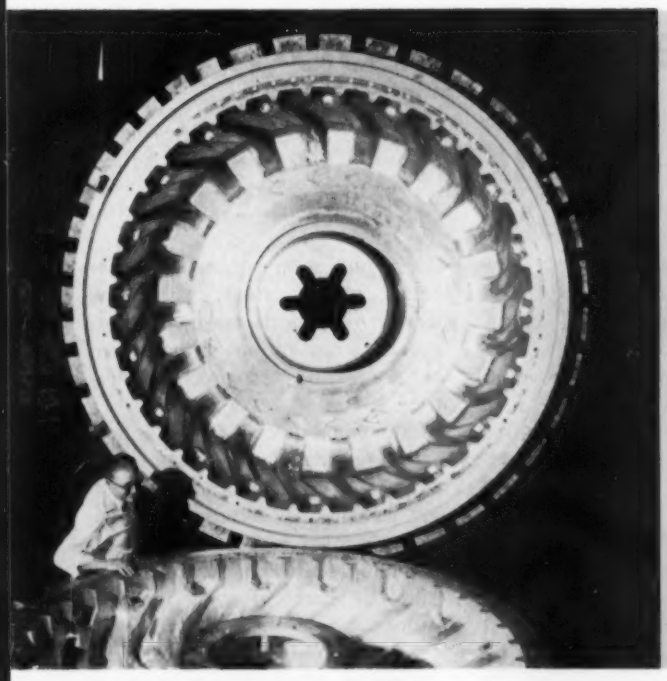


How To Get More For Your Metalworking Dollar

Nonferrous Castings

IN THIS FEATURE

In this country alone, more than a billion dollars is spent each year for about 1 million tons of nonferrous castings.

It's a big, important and complex part of metalworking, one that both demands and merits detailed study.

Nor is one look likely to be enough. The nonferrous castings field is changing all the time—reaching out with new alloys into whole new areas of use.

If you're now using these versatile cast metals, keep up to date. Make sure you're getting the best alloy for a particular job, and that it's being cast and processed by the most economical methods. This means overall economy; the more costly way may sometimes prove the cheapest.

And if you're now fabricating nonferrous metals by other methods, it still pays to keep an eye on castings. New developments may shed a different light on your operations—or give a competitor an edge.

On the next 15 pages you'll find a quick rundown on current practice.

Aluminum Processes, Properties Make Selection Critical

Cast aluminum has an impressive array of properties — among them, light weight, good corrosion resistance and high conductivity.

■ In the cast form, aluminum alloys rank among the most versatile metals.

Aluminum is light. In ground transport, the pounds it saves mean added payload and greater operating efficiency. In the air, it also spells increased range.

Moving parts that are lighter operate with less power and less vibration. And items that have to be moved, like portable tools, often owe their very existence to aluminum castings.

Highly Resistant—Outdoors, cast aluminum needs no painting or other protection against the elements. Indoors or out, its immunity to many chemicals makes it a natural for a host of jobs in the chemical, petroleum and process industries.

Aluminum quickly dissipates heat —an important factor in items such as pistons, cylinder heads or cooking utensils. Its electrical conductivity is also high, which makes aluminum castings useful for all kinds of electrical connectors and fittings.

As to mechanical properties, cast aluminum offers a wide range of combinations. The many alloys and tempers that are available today permit tailoring strength, toughness and other properties to a vast array of service conditions.

Low Ultimate Cost — Aluminum castings are easy to work, which cuts down on cost of machining and other processing. Even more important, it gives several times as many castings for a given weight as most other cast metals. And because it's light, handling costs are materially reduced.

There are many other ways in which money can be saved. For example, an alloy can be chosen that will take a high polish; this often does away with expensive electroplating. Since the metal doesn't rust, protective coatings usually aren't needed.

In many cases, aluminum castings can replace more costly fabricated assemblies. Moreover, the material can be cast in relatively thin sections

◀

MACHINES EASILY: High feeds and speeds can be used on aluminum castings. This particular job is an experimental aluminum wheel.

Aluminum Offers Wide Choice

and still provide good strength and other properties.

Uses All Methods — Aluminum owes much of its wide use to the fact that it fits into all three of the common casting methods — sand, permanent mold, and pressure diecasting. To fill special needs, it also finds use in centrifugal casting, investment or precision casting, plaster-mold and shell-mold work.

Choice of process is important. It affects casting design and has a big bearing on alloy selection.

The number of parts needed is a factor weighing heavily on choice of process. Sand casting is generally used for small quantities—patterns are much less expensive than dies for permanent mold or pressure diecasting. As parts volume increases one of the two other main processes comes into play, the choice depending on casting size, complexity, and other factors.

How Many, What Size—Diecasting is mainly a mass-output process, widely used for instrument cases and parts, toys, automotive parts and the like. Sand casting is best suited for large pieces, with permanent mold casting second. While large diecasting machines are now available, cost of machines and dies goes up sharply as part size increases.

For close dimensional tolerances, permanent mold and diecasting are the usual choices. However, special patterns, equipment, materials and practices will hold close tolerances on sand cast work as well.

Surface finish is another area in which the metal-mold processes excell. Often, the savings in machining and finishing offset the higher first cost. They also produce generally higher mechanical properties.

On the other hand, sand casting is more versatile where intricate shapes are concerned. It also cuts down on lead time needed for an initial order of aluminum castings. Moreover, sand casting permits rapid, inexpensive design changes. For this reason it's often used during development stages of parts

ASTM Alloy	Commercial Designation	Nominal Composition, pct				
		Cu	Si	Mg	Zn	Other
Sand Casting Alloys		**(ASTM Spec. B26-54T)**				
C4A	195	4.5	—	—	—	—
CG100A	122	10.0	—	0.25	—	—
CN42A	142	4.0	—	1.5	—	2.0 Ni
CS43A	108	4.0	3.0	—	—	—
CS72A	113	7.0	2.5	—	—	—
G4A	214	—	—	4.0	—	—
G10A	220	—	—	10.0	—	—
GS42A	B214	—	1.8	4.0	—	—
S5A	43	—	5.25	—	—	—
S5B	43	—	5.25	—	—	—
SC51A	355	1.25	5.0	0.5	—	—
SC64B	319	3.8	6.25	—	—	—
SC64C	319	3.75	6.25	—	—	—
SC82A	327	1.5	7.8	0.4	—	0.4 Mn
SG70A	356	—	7.0	0.4	—	—
ZC81A	Tenzaloy	0.6	—	0.35	7.5	—
ZG32A	Ternalloy 5	—	—	1.6	3.0	0.5 Mn, 0.3 Cr
ZG42A	Ternalloy 7	—	—	2.1	4.25	0.5 Mn, 0.3 Cr
ZG61A	40E	—	—	0.6	5.5	0.5 Cr, 0.3 Cr
ZG61B	A612	0.5	—	0.7	6.5	—
Permanent Mold Casting Alloys		**(ASTM Spec. B108-54T)**				
CG100A	122	10.0	—	0.25	—	—
CN42A	142	4.0	—	1.5	—	2.0 Ni
CS42A	B195	4.5	2.5	—	—	—
CS66A	152	6.5	5.5	0.4	—	—
CS72A	113	7.0	2.5	—	—	—
CS104A	138	10.0	4.0	1.0	—	—
GS42A	B214	—	1.8	4.0	—	—
GZ42A	A214	—	—	4.0	1.8	—
S5A	43	—	5.0	—	—	—
S5B	5 pct Si	—	5.0	—	—	—
SC51A	355	1.3	5.0	0.5	—	—
SC64A	A108	4.5	5.5	—	—	—
SC64B	Alleast	3.7	6.3	—	—	—
SC64C	319	3.7	6.3	—	—	—
SC122A	Red X-13	1.5	12.0	0.7	—	0.7 Mn
SG70A	356	—	7.0	0.3	—	—
SN122A	A132	1.0	12.0	1.0	—	2.5 Ni
ZC80A	C612	0.5	—	0.35	6.5	—
ZC81B	Tenzaloy	0.7	—	0.35	7.5	—
ZG32A	Ternalloy 5	—	—	1.6	3.0	0.5 Mn, 0.3 Cr
ZG42A	Ternalloy 7	—	—	2.1	4.3	0.5 Mn, 0.3 Cr
Diecasting Alloys		**(ASTM Spec. B85-54T)**				
G8A	218	—	—	8.0	—	—
SC5	43	—	5.0	—	—	—
S12B	13	—	12.0	—	—	2.0 Fe max.
S12A	A13	—	12.0	—	—	1.3 Fe max.
SC54B	85	3.5	5.0	—	—	2.0 Fe max.
SC54A	A85	3.5	5.0	—	—	1.3 Fe max.
SC84A	A380	3.5	8.5	—	—	1.3 Fe max.
SC84B	380	3.5	8.5	—	—	2.0 Fe max.
SG100A	A380	—	9.5	0.5	—	1.3 Fe max.
SG100B	380	—	9.5	0.5	—	2.0 Fe max.

Quick Guide to Aluminum Alloy Selection

Main Properties Wanted	Sand Cast	Permanent Mold	Diecast
BEST CASTABILITY:			
Moderate strength, as cast	43 108	43 A108	13 A13
Better strength, as cast	363	363	A380
High strength, when heat treated	355-HT 356-HT 363-HT	355-HT 356-HT 363-HT	
PRESSURE TIGHTNESS:			
Moderate strength, as cast	43 108	43 A108	13 A13
Better strength, as cast	363	363	360 A360 A380 380
High strength, when heat treated	355-HT 356-HT 363-HT	355-HT 356-HT 363-HT	
GOOD STRENGTH, AS CAST:			
Medium ductility	363	363	13 360 A380
Higher ductility	214	A214	218 A360
HIGH STRENGTH, HEAT TREATED:			
Medium ductility	355-HT 356-HT 363-HT	355-HT	
Higher ductility	195-HT 220-HT	B195-HT 356-HT 363-HT	
HIGH HARDNESS:			
(Ductility is low, yield strength high)	122-HT	122-HT A132-HT D132-HT 142-HT	
HIGH STRENGTH AT MODERATE TEMPERATURE:			
(Alloys retaining best strength up to 500°F)	122-HT 142-HT 212 214	122-HT A132-HT D132-HT 138 142-HT 212	13 360 A360 A380 380
BEST HARDNESS AND STRENGTH AT HIGHER TEMPERATURES:	122-HT 142-HT	122-HT A132-HT D132-HT 142-HT	
HIGHER DUCTILITY:	43 195-HT 214 220-HT	43 A214 B195-HT	43 218 A360

Main Properties Wanted	Sand Cast	Permanent Mold	Diecast
GOOD MACHINABILITY:	122-HT 142-HT 195-HT 212 214 B214 220-HT	122-HT 138 142-HT A214 B214	218
GOOD POLISHABILITY:	122-HT 142-HT 212 214 B214 220-HT	122-HT 138 142-HT B195-HT A214 B214	218 A380 380
BEST ANODIZED APPEARANCE:			
(No discoloration in anodizing)	214 F214 220-HT	A214	218
GOOD ANODIZED APPEARANCE:			
(Very slight discoloration in anodizing)	195-HT B214	142 B214	
BEST CORROSION RESISTANCE:			
(* Recommended for architectural, ornamental, marine, food and dairy uses)	43* 214* B214* F214* 220-HT 356-HT	43 A214* B214* 356-HT	13 A13 43* 218* 360 A360
CORROSION RESISTANCE IMPROVED BY ANODIZING:	43 214 B214 F214 220-HT 355-HT 356-HT	43 B195-HT A214 B214 355-HT 356-HT	218 360 A360
TAKE ELECTROPLATING SATISFACTORILY:	43 108 122-HT 142-HT 195-HT 355-HT 356-HT 363 363-HT	43 A108 122-HT 142-HT B195-HT 355-HT 356-HT 363 363-HT	43 360 A360 A380 380
EASILY WELDED:			
(* If castings are to be heat treated, it should be done after welding)	43 108 355* 356* 363*	43 A108 355* 356* 363*	

Note: Alloys are listed by commercial designations. Symbol HT means heat treated. All others are as cast.

which will later be made in permanent molds or diecast.

Why It's Alloyed—Outside of a very few special cases, pure aluminum finds little use. From a castings standpoint, alloying elements are added for two main reasons. One is to improve foundry traits, such as raising fluidity or reducing hot shortness. The other is to provide desired properties in the finished casting or to make it heat treatable.

Silicon is the most widely used alloying element. It improves fluidity, making thin sections and fine details easier to cast. It lowers shrinkage, makes for less leakage in a finished casting, reduces coefficient of expansion and improves weldability.

Copper is added for hardening. It raises strength and makes aluminum casting alloys heat treatable. It makes the material harder to cast and slashes corrosion resistance. On the plus side, it improves machinability.

Effects of Mg and Ti—Magnesium provides both increased strength and ductility, along with corrosion resistance and easier machining. Alloys containing more than 8 pct Mg respond to heat treatment.

Titainium refines the grain structure, especially when coupled with boron. It improves tensile strength and ductility, as do boron additions alone.

To a lesser extent, a number of other elements are also used. These include iron, manganese, chromium, nickel, zinc, tin, beryllium and lead. In almost every case, they're added along with the alloying elements already discussed.

Calls for Compromise—At first glance the problem of picking the right alloy for a given job may seem like a tough one. Dozens are available, even after a particular casting method has been chosen.

The truth is, no one alloy will furnish a full measure of all the properties a designer may want. It boils down to careful give and take. a compromise between mechanical properties, physical properties and foundry traits.

Mechanical properties usually govern whether or not the alloy has to be heat treatable. High strength requires heat treatment. Special needs such as extreme hardness, high impact strength or dimensional stability might dictate an alloy that's wanting in other respects.

Physical properties may be the prime factor where the main consideration is high electrical or thermal conductivity, good corrosion resistance or low thermal expansion.

Method May Come First—Then again, properties sometimes must bow to foundry traits, especially if a large or complex casting is involved. If a casting has thin sections it calls for an alloy with high fluidity. Add intricate shape to thin sections and the alloy must have high resistance to hot cracking as well as good fluidity.

Many of the foundry factors can be detoured by good design. For the most part, the same design principles used on other castings apply also to aluminum (see How to Get More For Your Metalworking Dollar, Ferrous Castings, The IRON AGE, Feb. 13, 1958). A good rule, too, is to talk it over with the foundryman.

How to Machine Aluminum Castings

Operation†	Rough Machining			Finish Machining		
	Maximum Cut, in.	Speed, fpm	Feed, in.	Cut, in.	Speed, fpm	Feed, in.
Lathe Turning						
Class A alloys, not heat treated	.25 (a)	500–900	.020–.030	.002–.010	Maximum	.002–.010
All Others	.19 (a)	400–800	.007–.020	.002–.010	600–900	.002–.010
Milling						
Class A alloys, not heat treated	.25	400–600 (b) 500–700 (c) Maximum (d)	5–15 (e)	.010–.020	500–700 (b) 500–700 (c) Maximum (d)	10–25 (e)
Class A alloys, heat-treated	.25	400–600 (b) 500–700 (c) Maximum (d)	40–10 (e)	.010–.020	500–700 (b) 500–700 (c) Maximum (d)	5–15 (e)
Class B alloys						
Class C alloys	.25	300–500 (b)	3–8 (e)	.010–.020	500–700 (b)	4–10 (e)
Boring						
Light duty (1 to 2 in.)	.09 (a)	Maximum (f)	.010–.020	.010–.020 (a)	Maximum (f)	.001–.005
Medium to heavy duty	.25 (a)	600–1000	.007–.015	.010–.020 (a)	600–1000	.001–.003
Shaping						
Heavy duty (36 in.)	.25	Maximum (g)	.010–.030	.005–.010	Maximum (g)	.100–.150
Planing	.38	Maximum (h)	.025–.100	.005–.015	Maximum (h)	.050–.375

† Class A alloys are 122, A214, B214. Class B alloys include 108, 142, 195, 214, 319, and 355. Class C alloys are 13, 43, A132, 356. (a) Cut measured on radius. (b) For carbon steel tools. (c) For high-speed steel tools. (d) For cemented carbide tools. (e) Travel of work. (f) Peripheral speed of tool is maximum of most machines. (g) Travel of ram. (h) Speed of table.

Copper: Good on All Counts

Versatile in the foundry as well as in the field, copper alloys are easy to cast, process, finish and join.

Here are the main types and where they're used.

■ Copper-base casting alloys include a host of materials that offer a wide range of properties. Tensile strengths run up to 155,000 psi, with yield strengths on the order of 90,000 psi. They have excellent corrosion resistance, and some of the bronzes perform well at temperatures up to 900°F. Machinability is excellent, and they're easy to join by silver brazing and other methods.

Casting ease accounts for much of their widespread use. Copper-base alloys can be cast by nearly all molding methods, including sand molds, permanent molds, centrifugal casting, plaster molding, precision investment molding and shell molding.

Sand Is Used Most—Just about all of the copper-base alloys can be cast in sand. It's fast and usually proves cheapest, with low pattern costs.

Permanent molds are expensive, but give high yields per set and work to much closer dimensions. Because they produce finer grain structures, they improve mechanical properties and lower machining cost.

As a rule tolerance control is about ±0.010 in., but closer control is possible. Permanent molding is generally confined to the tin, silicon, aluminum and manganese bronzes, and yellow brasses. Casting size, however, is limited.

The same is true of diecasting. Used mainly for yellow brass, it's the choice for difficult cored sections or where rather large surface area compared to weight is needed. Thin sections with tolerances of 0.070 in. in thickness are easy to obtain. While dies are costly, it's a natural for large volumes of small, highly intricate pieces.

Makes Big Castings—Centrifugal casting has become an important method where the copper alloys are concerned. Almost all of the alloys can be cast in this way. Size isn't important — centrifugal castings ranging from a few ounces to 25 tons are made regularly.

Castings must, of course, be cylindrical. Centrifugal castings are sound—the high pressures involved promote good feeding. Chills can be used to produce very fine grain.

Plaster molding is best suited for aluminum bronzes, yellow bronzes, manganese bronzes, nickel bronzes, silicon brasses and bronzes, or any alloy of low lead content with an aluminum or silicon skin. It reproduces fine surface details and produces denser metal.

Since plaster casting can be made largely automatic and continuous, it permits high output of small, detailed castings. Surface finish is excellent, often offsetting higher mold costs with savings in machine finishing.

Also for Accuracy — Precision investment casting turns out highly intricate parts to close tolerance—with care, ±0.005 in. or better. While it minimizes machining and finishing, the separate patterns needed for each casting keep the

CLOSE TOLERANCE WORK: Precision Investment casting minimizes finishing and machining on these bronze, brass and copper castings.

Copper-Base Castings and Their Properties

ALLOY	Nominal Composition, pct										Tensile strength, 1000 psi	Yield strength, 1000 psi	Elongation, pct in 2 in.	Modulus of elasticity[1]	Hardness, Bhn[2]	Compression strength, 1000 psi		Impact strength, (Izod) ft-lb	Specific gravity	Weight, lb per cu. in.	Patternmakers' shrinkage, in. per ft	Electrical conductivity[3]	Thermal conductivity, pct of Cu	Melting point, °F	Solidification range, °F	Pouring temperature, (light castings) °F	Pouring temperature, (heavy castings) °F
	Cu	Sn	Pb	Zn	Al	Fe	Si	Mn	Ni							0.001 in. set	0.1 in. set										
TIN BRONZE																											
88-10-2	88	10	2								40-60	20-25	20-35	10-12	60-75	14-16	40-45	8-16			☆	10-12	12-13	1900-1930	1870-1880	2100-2200	1920-2100
88-8-4 (G Metal)	88	8	4								47-51.5																
87-8-1-4 (PC Metal)	87	8	4								30-43	16-24	16-30			9-11	32-38	8-16	8.70-8.87	.314-.320	☆-⅛	14-16	12-13	1900-1930	1870-1880	2100-2200	1920-2100
87-10-1-2	87	10	1	2							38-46	18-28	18-25	10-12	65-90	12-14	40-46	12-16	8.70-8.87	.314-.320	☆-⅛	10-12	12-13	1900-1930	1870-1880	2100-2200	1920-2100
85-5-2-4 (M Metal)	85	6	2	4							38-46	16-21	22-40	10-12	68-72	12-15	30-36	9-12	8.60-8.80	.314-.320	☆-⅛	13-15	12-13	1900-1930	1870-1880	2100-2200	1920-2100
RED AND SEMI-RED BRASS																											
85-5-5-5	85	5	5	5							32-43	18-24	20-35	9-14	55-65	10-12	28-33	6-12	8.7-8.9	.314-.321	☆	10-12	12-13	1900-1930	1870-1880	2100-2200	1920-2100
81-3-7-9	81	3	7	9							29-39	13-17	15-30	9-14	60-80			6-10	8.6-8.9	.311-.318	☆-⅛	14-16	12-13	1900-1930	1870-1880	2100-2200	1920-2100
78-3-6-13	78	3	6	13							27-37	12-16	15-30	9-14	80-90	6-10	28-32	6-10	8.58-8.7	.309-.314	☆-⅛	12-13	12-13	1900-1930	1870-1880	2100-2200	1920-2100
HIGH-LEADED TIN BRONZE																											
80-10-10	80	10	10								27-37	15-22	6-12	9-13	65-70	12-16	40-47	2-6	8.7-8.9	.321-.329	½-⅝	7-12	12	1785-1779		2000-2200	1960-2100
83-7-7-3	83	7	7	3							30-36	17-21	12-20	13-16	60-65	14-16		3-6	8.88-8.96	.320-.322	☆-⅛	10-14		1760-1800		2000-2200	1960-2060
78-7-15	78	7	15								25-33	14-20	10-18	8-12	50-60	13-16	30-40	4-8	8.1-8.4	.320-.340	☆			1700-1760		2000-2250	1940-2100
70-5-25	70	5	25								23-30	11-16	7-16	6-12	42-60	12-14	22-25	4-6	8.2-8.5	.322-.343	☆			1650-1700		2000-2200	1960-2060
LEADED YELLOW BRASS																											
High-Copper Yellow Brass (400)	71	1	3	25							35-40	12-14	25-40	11-14	40-60	8-10	28-32		8.48-8.56	.305-.309	☆-⅛			1780-1790		1960-2110	1880-2060
No. 1 Yellow Brass (400)	67	1	3	29							30-38	11-18	20-25	12-14	40-60	8-10	28-32		8.44-8.5	.303-.307	☆-⅛	18-22	28-32	1760-1725		1960-2050	1780-1960
Low-Copper Yellow Brass (405)	60	1	1	37	0.25						40-48	14-20	15-25	13-15	60-70				8.38-8.47	.300-.306	☆-⅛	28-32		1675-1725		1900-2000	1720-1900
MANGANESE BRONZE																											
Low Tensile	58		39	1	1						65-90	22-40	20-35	12-15	90-120	22-28	85-90	20-40	8.4-8.5	.285-.307	☆-⅛			1690	1660-1700	1960-2000	1760-1900
Medium Tensile	66		23	6	3						80-100	45-55	15-30	13-16	160-200	22-28	85-90	10-20	8.0-8.5	.289-.307	☆-⅛					1960-2000	1760-1900
High Tensile	62		25.5	6	3	3.5					110-120	65-80	12-20	16-17	170-225	55-65	80-90	7-12	7.7-8.0	.278-.289	☆-¼					1950-2000	1760-1900
SILICON BRONZE AND BRASS																											
Herculoy	31.5	0.5	4			4					45-65	20-35	15-40	14-16	65-90				8.4-8.6	.300-.310	☆						
Everdur 1000	96					4	1				43-58	17-28	20-30	14-16	80				8.28-8.35	.290-.300	☆-⅛						
Tombasil	82		14			4					50-60	25-38	15-25	14.5-16.5	125-160				8.25-8.35	.300-.305	☆-⅛						
ALUMINUM BRONZE																											
90-1-10—(As cast)	89			10	1						60-75	25-30	15-25	14-16	100-140	16-20	75-80	16-30	7.3-7.65	.264-.276	☆-⅛	12-15	13.8	1980	1960-1700	1960-2000	1780-1900
—(Heat treated)											80-95	40-60	8-16		160-225	28-45		16-23			☆-⅛	12				1950-2000	1760-1900
88-4-10—(As cast)	86			10	4						70-90	30-41	12-15					10-18	7.52	.272	☆-⅛						
—(Heat treated)											90-110	40-50	8-15					20									
82-4-10-4—(As cast)	82			10	4				4		95*	45*	7*	17*													
—(Heat treated)											115*	70*	8*	17*													
NICKEL SILVER																											
18 Pct Nickel Silver	50	3	16						18		35-55	17-28	15-30		60-100				8.6-8.9	.310-.322	☆	5-6		1900-1930	1870-1880	2100-2200	1920-2100

Notes: 1—$\times 10^{-6}$ psi. 2—10 mm ball, 500 kg load. 3—Pct of annealed Cu at 20°C. *—Minimum.

From data by Federated Metals Div., American Smelting and Refining Co.

cost rather high. Practical size is limited to about 3 in. maximum dimensions, with sections no thicker than about ½ in.

Shell molding can also be used on many of the copper-base alloys. It calls for quite a bit of equipment and accurate patterns, which restricts it to long runs and a need for good finish.

Nine Alloy Groups — Copper-base casting alloys fall into nine main groups. These are copper (99.8 pct pure), tin bronze, high-leaded tin bronze, manganese bronze, aluminum bronze, silicon bronze and brass, red and semi-red brass, yellow and leaded yellow brass, and nickel silver.

One thing most of the copper-base casting alloys have in common is good machinability. For the most part, they behave pretty much like wrought materials.

Main Uses for Copper Casting Alloys

Alloy	Applications	
Nickel-Tin Bronzes	Bearings Gears	Wear Plates Worm Gears
High-Tin (10-20 Pct) Bronzes	Bearings: Bridge Electrical Machinery Rolling Mill Locomotive Machine Tool Trunnion Turntable	Bells Gears Piston Rings Worm Wheels
88-8-0-4	Bearings: Bridge Machine Tool Trunnion Fuel Pumps Impellers Injectors Paper Machinery Piston Rings	Pump Bodies Railroad Fittings Steam Fittings Trolley Wheels Valve: Discs Seats Stems Gears
88-6.5-1.5-4	Bearings Carburetors Cocks and Faucets Flanges Fuel Pumps Impellers Injectors Paper Machinery Pump Bodies Railroad Fittings Steam Fittings	Statuary Valve: Discs Seats Stems Valves: Air Compressor High Pressure Hydraulic Steam
85-5-5-5	Architectural Bearings Carburetors Cocks and Faucets Fixtures Flanges Fuel Pumps Impellers Injectors Memorial Markers Meters and Parts Paper Machinery	Piston Rings Pump Bodies Marine Fittings Statuary Valves: Hydraulic Steam Valve: Discs Seats Stems
81-3-7-9	Cocks and Faucets Fixtures Flanges Marine Fittings	Ornamental Statuary Valves: Hydraulic

Alloy	Applications	
80-10-10	Bearings: Machine Tool Electrical Machinery Pump Railroad Rolling Mill Self Lubricating Trunnion	Impellers Paper Machinery Pump Bodies
77-8-15 to 65-5-30	Bearings: Locomotive Pump Railroad Rolling Mill Self Lubricating Gas Engine Diesel Engine	Impellers Paper Machinery
Yellow Brass	Architectural Band Instruments Carburetors Cocks and Faucets Fixtures Lamp Fixtures Locks	Medallions Meter Parts Paper Machinery Railroad Fittings Ornamental Statuary Valves
Manganese Bronze	Architectural Ball Bearing Races Bearings: Rolling Mill Trunnion Gears	Gear Shifter Forks Impellers Marine Propellers Marine Fittings Valve Stems Worm Wheels
Aluminum Bronze	Ball Bearing Races Bearings: Rolling Mill Machine Tool Gears Gear Shifter Forks Impellers Paper Machinery Pickling Baskets Tools, non-sparking	Trolley: Shoes Wheels Valve: Seats Stems Valves Wear Plates Worm Wheels
Silicon Bronze	Bridge Bearings Bells Impellers Paper Machinery Memorial Markers Pump Bodies	Marine Fittings Trolley: Shoes Wheels Valves Valve Stems
Silicon Brass	Bearings Gears Impellers	Rocker Arms Valve Stems
Nickel Silvers	Architectural Bearings, Turbine Dairy Equipment Fixtures Laundry Machinery Marine Fittings Milk Machinery	Ornamental Paper Machinery Railroad Fittings Typewriter Parts Valve: Discs Seats

From a machining standpoint, the cast alloys fall into three main groups: gummy alloys, short-chip alloys, and free-cutting alloys.

How Each Behaves — In the gummy category are copper, aluminum bronzes with low aluminum content, and other single-phase alloys. Compared to the other copper-base materials they're the hardest to work. The tool tends to drag instead of giving a good clean cut.

The short-chip group is made up of alloys that contain two or more metallurgical phases. Generally, the second phase is harder and more brittle than the matrix metal, causing the chips to break off short. This group includes silicon bronzes and brasses, high aluminum bronzes and higher tin alloys.

Comprising the free-machining group are the alloys to which lead has been added. Lead is present as a minute dispersion throughout the matrix metal and remains insoluble in the other phases. Being soft, it lets the metal break into very short chips. This permits high speeds and heavy cuts. Plumbing brasses, hydraulic bronzes and some gun metals fall into this category.

No Joining Problems — Copper-base alloys are easy to join. For castings, a large proportion of the joints are simple mechanical connections between threaded male and female pieces.

Ordinary solder is widely used, except on aluminum bronze. For greater strength and service above 250°F, the choice is silver brazing alloys or copper - phosphorous brazing rods. Some of the alloys can also be welded by various processes.

■ How to Get More for Your Nonferrous Castings Dollar | **Part 3**

Choose Magnesium for Lightness

Its high strength-weight ratio spurred magnesium's early growth.

Emphasis to date has been on weight-saving in transportation.

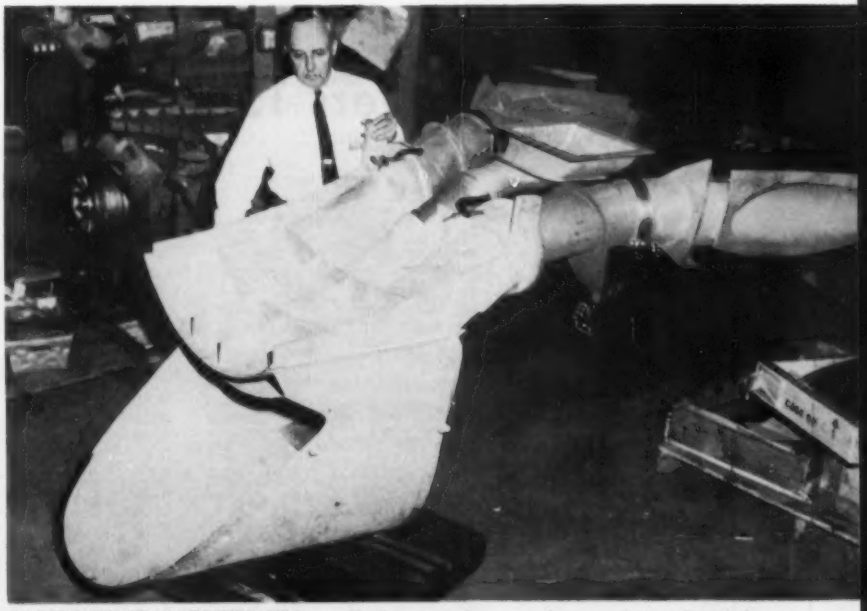
Now, designers are applying its attributes in many other fields as well.

■ Magnesium-base alloys are the lightest of all structural metals and offer the highest strength-weight ratio. This is why most castings made of it to date have gone into aircraft and a variety of airborne equipment.

But other uses are growing fast. Big inroads are being made in truck and bus body parts to cut vehicle weight and increase payload. A number of diecast magnesium parts are going into many makes of automobiles as well.

Cast magnesium-base alloys are also going into many types of materials handling equipment. Tools and portable equipment which must be carried or used manually now embody large amounts of the lightweight castings. Moving and reciprocating parts of cast magnesium operate with less vibration, which permits higher speeds and output. They also cut down on power needs in many applications.

Past Problems Overcome—Lim-



SAVES TIME, MONEY: Thin-walled magnesium casting made by Osbrink Mfg. Co., Los Angeles, has replaced sheetmetal on Regulus missile.

Here's How to Heat Treat Magnesium Castings

Alloy and Temper	Heat Treatment		
	Solution	Precipitation	Stabilizing
AM80A – T4	Raise to 775°F in 2 hours. Soak 18 hours minimum.	—	—
– T6		—	—
AM100A – T6		16 hours at 350°F	—
AZ63A – T5	—	—	2 to 5 hours at 450° to 550°F
– T4	Raise to 730°F in 2 hours. Soak 10 hours minimum.	6 to 18 hours at 350° to 425°F	—
– T6			—
AZ91C – T4	Raise to 770°F in 2 hours. Soak 18 hours minimum.	—	—
– T6		6 to 18 hours at 350° to 425°F	—
AZ92A – T5	—	—	5 hours at 425°F
– T4	Raise to 770°F in 2 hours. Soak 18 hours minimum.	—	—
– T6		6 to 18 hours at 350° to 425°F	—
EK30A – T6	18 hours at 1050°F	16 hours at 400°F	—
EK41A – T5	—	—	12 hours at 350°F
– T6	18 hours at 1050°F	16 hours at 400°F	—
EK33A – T5	—	—	12 hours at 350°F
ZK51A – T5	—	—	2 hours at 625°F
ZK61A – T6	1 to 5 hours at 900°F	24 to 36 hours at 285° to 300°F	—
HK31A – T6	2 hours at 1050°F	16 hours at 400°F	—
ZH62A – T5	—	—	24 hours at 300°F

iting factors in the past were corrosion and fire hazard. With today's alloys, casting techniques and surface treatments, corrosion is no longer a problem. Fire hazard has been overcome mainly by better understanding of the true facts. In solid form, magnesium is quite hard to ignite. As to magnesium fires generated in machine shops, the solution is simply a matter of good shop practice and good housekeeping.

Magnesium-base alloys can be cast by all casting methods. At present, however, sand, permanent mold and diecasting account for nearly all of the volume. Development work and a small amount of production are under way with shell and plaster molds. Some investment casting is also being done, part of it centrifugally.

Four Classes—Casting alloys are of four general types: magnesium-aluminum-zinc; magnesium-zinc-zirconium; alloys containing rare earths and zirconium, with or without zinc; and alloys containing thorium, with or without zinc.

The Mg-Al-Zn and Mg-Zn-Zr series are used for services below about 250°F. Those containing rare earths operate in the 500-550°F range, while the thorium-

Magnesium Offers 15 Choices

ASTM B80-53T Alloy	Composition, pct										Physical Properties			
	Al	Mn (min.)	Zn	Rare Earths	Th	Zr	Si*	Cu*	Ni*	Other Impurities*	Specific Gravity (75 °F)	Density, lb/cu in.	Thermal Conductivity, CGS units (212–370 °F)	Electrical Resistivity, microhm-cm (68 °F)
AM80A	8.5	0.15	0.5*	—	—	—	0.3	0.10	0.01	0.3	1.80	0.065	0.18	—
AZ81A	7.6	0.13	0.7	—	—	—	0.3	0.10	0.01	0.3	1.80	0.065	—	15.7
AM100A	10.0	0.10	0.3*	—	—	—	0.3	0.10	0.01	0.3	1.81	0.066	0.17	15.0
AZ63A	6.0	0.15	3.0	—	—	—	0.3	0.25	0.01	0.3	1.83	0.067	0.18	11.5
AZ91A	9.0	0.13	0.7	—	—	—	0.5	0.10	0.03	0.3	1.81	0.066	0.17	17.0
AZ91B	9.0	0.13	0.7	—	—	—	0.5	0.3	0.03	0.3	1.81	0.066	0.17	17.0
AZ91C	8.7	0.13	0.7	—	—	—	0.3	0.10	0.01	0.3	1.81	0.066	0.17	17.0
AZ92A	9.0	0.10	2.0	—	—	—	0.3	0.25	0.01	0.3	1.82	0.066	0.16	16.0
EK30A	—	—	0.3*	3.3	—	0.3	—	0.10	0.01	0.3	1.79	0.065	0.27	5.9
EK41A	—	—	0.3*	4.0	—	0.7	—	0.10	0.01	0.3	1.81	0.066	—	6.9
EZ33A	—	—	3.0	3.3	—	0.7	—	0.10	0.01	0.3	1.82	0.066	—	6.9
HK31A	—	—	0.3*	—	3.2	0.7	—	0.10	0.01	0.3	1.79	0.065	0.23	7.2
HZ32A	—	—	2.1	—	3.2	0.7	—	0.10	0.01	0.3	1.83	0.067	0.25	6.6
ZK51A	—	—	4.5	—	—	0.7	—	0.10	0.01	0.3	1.82	0.066	0.20	—
ZK61A	—	—	6.0	—	—	0.7	—	0.10	0.01	0.3	1.83	0.067	0.21	—

* Maximum.

Treatment Broadens Mechanical Properties

ASTM Alloy	Condition[1]	Tensile Strength, 1000 psi	Yield Strength, 1000 psi	Elongation, pct in 2 in.	Hardness		Fatigue Strength, 1000 psi[2]
					Bhn	Re	
AM80A	F	29	14	6	46	51	9
	T4	38	11	12	48	56	10
AZ81A	T4	40	14	12	55	66	13
AM100A[3]	F	22	12	2	54	65	10
	T4	40	13	10	52	62	11
	T6	40	16	4	60	72	10
	T61	40	22	1	69	80	10
AZ63A	F	29	14	6	50	59	11
	T4	40	14	12	55	66	13
	T5	29	14	5	—	—	11
	T6	40	19	5	73	83	12
AZ91A[4]	F	33	22	3	60	72	11
AZ91B[4]	F	33	22	3	60	72	11
AZ91C	F	24	14	2	52	62	11
	T4	40	14	11	55	66	13
	T6	40	19	4	73	83	12
AZ92A[5]	F	24	14	2	65	77	11
	T4	40	14	10	63	75	13
	T5	24	14	2	—	—	11
	T6	40	23	2	84	90	12
EK30A	T6	23	16	3	45	49	—
EK41A	T5	23	16	1	50	59	—
	T6	25	18	2	50	59	—
EZ33A	T5	23	16	3	50	59	—
HK31A	T6	37	18	8	55	66	—
HZ32A	T5	32	15	10	57	—	—
ZK51A	T5	41	26	8	65	77	10
ZK61A	T6	45	30	10	—	—	—

[1] F, as cast; T4, solution heat treated; T5, artificially aged only and T61, solution heat treated and artificially aged.
[2] Based on 500,000,000 cycles of completely reversed stress as determined on R. R. Moore type machine and specimen.
[3] Permanent mold properties. [4] Diecast properties. [5] Sand and permanent mold properties.

containing materials will go to about 650°F.

In the Mg-Al-Zn series, best mechanical properties are obtained when aluminum content is between 6 and 10 pct and zinc ranges from 0 to 3 pct. All of these alloys contain 0.10 to 0.30 pct Mn.

A Good Response — Mg-Al-Zn castings (except diecastings) are usually heat treated to improve properties. Solution heat treatment makes them tougher and more ductile. For maximum yield strength and hardness, solution heat treatment is followed by aging. Stress relief is also used on as-cast parts.

High creep strength between 200° and 650°F is a noteworthy trait of the rare-earth and thorium-containing alloys. They have 3 to 4 pct rare earths and about 3 pct Th, respectively. Zinc-containing alloys of these series get a low temperature (350-425°F) aging treatment only; some of the others are solution heat treated and then aged. Most of the alloys in these two classes must be saturated with zirconium to assure desired properties.

Mg-Zn-Zr alloys offer high yield strength combined with good elongation. Properties of ZK51A are developed by aging only, at 350° to 425°F. ZK61A requires solution heat treatment followed by aging. These types must also be saturated with zirconium.

Extra Design Care—Magnesium alloys are somewhat more sensitive to stress concentrations than most other structural metals. For this reason good casting design calls for extra care to avoid notches, sharp corners, and abrupt section changes. Generous fillets, beaded holes and blending of light to heavy sections should be used.

Machining ease is a leading attribute of magnesium alloy castings. Most operations can be done at the highest speed of the machine tool used. Less power is needed to remove a given volume of material than for any other metal. Surface finish is excellent, even without grinding or polishing.

Fight Heat and Corrosion With Nickel-Base Castings

These are the big guns for high-temperature service, very corrosive conditions or a combination of the two.

Littler-known properties of some types include good wear resistance, bearing qualities and high strength.

■ Nickel alloys are the standbys for resistance to heat and severe corrosives. While the casting alloys are similar to their wrought equivalents, they aren't alike. The cast materials have had to be modified to improve castability.

The result is that cast nickel alloys may not have the same degree of machinability, weldability or toughness. But they can be made to provide better thermal conductivity, resistance to heat, corrosion and wear, and other benefits.

There are six main classes of cast materials in the nickel family: the nickels themselves, nickel-copper alloys, nickel-chromium, nickel-tin, nickel-molybdenum, nickel-silicon, and nickel-iron. In addition, experimental nickel-aluminum alloys have also been made, mainly to explore elevated temperature properties.

The Five Nickels—Nickel comes in five casting grades. Of these, the low-silicon low-manganese grade accounts for most of the tonnage. It's used for castings in the textile, chemical, drug and food-handling fields.

The high carbon types (one with flake graphite, the other with nodules) provide a soft, plastically deformable material for shaft bearings, pump seals and the like, for mating with softer steels or other nonferrous alloys.

Additions of tin up to 3 pct create the fourth type, also a soft, plastically deformable material for certain bearing applications.

The fifth is a high-silicon grade for use where hard metals or hard-faced materials are met in metal-to-metal contact. Similar in many respects to Hastelloy D as well as the S and H Monels, silicon nickel finds use where complete protection against copper contamination is a must.

Nickel-Copper Alloys—Copper is completely soluble in nickel. This makes it possible to use either as a base and impress upon it the influence of the other. Broadly, the nickel-copper category also takes in several types with high tin, iron or chromium contents, but these will be described under separate headings.

This leaves the high nickel-copper Monels, of which there are three common grades. Plain Monel is used for all kinds of corrosion-resistant castings where high strength nonferrous metal is required. This includes pumps, fittings, valves and valve trim for steam and chemical process work. It resists most mineral and organic acids, and all alkalis. It won't withstand corrosion by nitric acid, sulfurous acid or strongly oxidizing salts such as ferric or cupric sulphates and chlorides.

Tougher Types—H Monel and S Monel give better frictional properties for use in wear-resisting pump and valve parts. In addition to wear resistance, their extra hardness imparts resistance to galling and deformation of high compressive loads.

They also retain mechanical strength and ductility to 900°F and can be used in superheated steam. They resist steam erosion, corrosion-erosion of wet steam, and steam contaminated with chemicals.

Silicon increases fluidity of plain Monel. Manganese toughens it, while iron raises hardness and strength.

H Monel is an intermediate grade of silicon-hardened Monel. It offers greater ductility and moderate hardness.

S Monel is also hardened with silicon. The silicon content shouldn't exceed 4.50 pct, but should be above 3.50 pct for good hardness and resistance to galling.

Nickel-Chromium Alloys—Typical of this group are the Inconels, nickel-base compositions with stainless steel chromium contents. Similar versions are Durco 10 and Illium G. All provide high heat and corrosion resistance, plus freedom from rust stains.

Colmonoy, while part of the group, is mainly a weld-deposited surfacing alloy that gets its easy melting and flow properties through boron and other additions. Colmonoy and Waukesha 50 are companion alloys for metal-to-metal sliding contact with hard or soft companions.

The 60 pct Ni compositions containing 20 to 40 pct Cr also fit into the nickel-chromium class. It includes many heat-resisting alloys of the Nichrome type. Heat-resistant Ni-Cr alloys are often made as precision castings.

Nickel-Tin Alloys — Tin-alloyed nickel and nickel-copper types are for resistance to wear and galling in fluid-handling equipment that re-

quires high corrosion resistance. Typical uses include valve seats and trim, bushings, seals and bearings. The material casts well and gives a smooth finish.

Waukesha 23 is a thin-alloyed member of this nickel-base family. Besides resistance to seizure and galling in metal-to-metal operations, it provides freedom from copper or iron contamination.

Cupro-nickel having 45 pct Ni, 45 pct Cu and 10 pct Sn is a familiar alloy widely used as a seat or disk material in valve trim. Its high strength, hardness and resistance to galling make it ideal for handling steam, for chemical and hot-water valves, and for control mechanisms.

The tin-alloyed cupro-nickels are also used for rollers, sleeves, bushings, slide valves, pump wearing rings and many other items that require high heat, wear and corrosion resistance.

Nickel - Molybdenum — The molybdenum - alloyed nickel - base materials are typified by the Hastelloys and Chlorimets. They're noted for outstanding resistance to hydrochloric acid and oxidizing acids at high temperatures.

As an example, Hastelloy C resists exposure for long periods in concentrators handling boiling ferric chloride.

Less severe corrosives hardly touch it. A polished specimen submerged in sea water for 12 years kept its original mirror finish with no weight loss.

Nickel - Silicon — Hastelloy D might be described as a special 10 pct Si grade of nickel-base alloy which has enough copper for exceptional resistance to hot sulphuric acid up to its boiling point. Pumps, valves, valve trim, nozzles and vessels are the sort of liquid-handling castings into which it commonly goes.

Nickel-Iron — Alloys with anywhere from 10 to 60 pct Fe are sometimes made for magnetic or electrical instrument control parts. These are made in about the same way as the high-nickel alloys.

These Alloys Typify the Nickels

Material	Composition, pct							
	Ni	Cu	Fe	Cr	Mo	Si	Mn	Others
Nickel	97	0.30	0.25	—	—	1.5	0.5	0.5 TC; 0.015 S*
Graphlake Nickel	bal.	—	—	—	—	2.32	1.84	1.15 TC
Graphnode Nickel	bal.	—	—	—	—	2	1.6	2.50 TC
Graphtin Nickel	bal.	—	—	—	—	2	1	1.00 TC; 2.5 Sn
Silicon Nickel	bal.	—	—	—	—	6	0.9	0.25 TC
Monel	63	32	1.5	—	—	1.6	0.75	0.15 TC; 0.015 S*
H Monel	63	31	2	—	—	3	0.75	0.10 TC; 0.015 S*
S Monel	63	30	2	—	—	4	0.75	0.10 TC; 0.015 S*
Inconel	77	0.25	6	14	—	2	0.8	0.20 TC; 0.01 S*
Silicon Inconel	bal.	—	8	14	—	5.5	1.2	0.20 TC
Durco 10	65	3.5	5	23	2	—	1	—
Illium G	60	3	8	21	5	1	1	1.0 W
Colmonoy	65–75	—	—	13–20	—	—	—	Fe + Si + C 0.10* B 2.75–4.75
Waukesha 50	50–60	—	14	16	1	1	1	Sb 2; Sn 5–7
Waukesha 88	bal.	—	—	12	3	0.2	0.8	Sn 4; Bi 3.50
Waukesha 23	78	—	—	—	—	—	2	Sn 8; Zn 8; Pb 4
Cupro-Nickel	45	45	—	—	—	—	—	Sn 10
Chlorimet 2	62	—	3	—	32	1	—	—
Chlorimet 3	60	—	3	18	18	1	—	—
Hastelloy A	bal.	—	18–20	1	20–22	1	3	—
Hastelloy B	bal.	—	4–7	1	26–30	1	1	—
Hastelloy C	bal.	—	4.5–7	15.5–17.5	16–18	1	1	4.25 W
Hastelloy D	bal.	3.85–4.25	1	1	—	8.5–10	1	—

*Maximum.

Trade names shown here were chosen because they are widely used and identify the product distinctively. Similar products under other trade names may be available. Some of the alloys are covered by patents.

Zinc Alloys and Diecasting Form a Natural Team

The process came first, but diecasting owes much of its present status to the properties of zinc alloys.

Selection in this case is simple —there are only two.

■ Zinc-base alloys reign supreme in the diecasting field. They account for more than two-thirds of all diecastings made in this country today.

In fact, diecasting owes much of its tremendous growth over the past 25 years to development of high-purity zinc. While zinc isn't used in its pure form, minute impurities in former alloys caused deterioration and made them unstable. Today's metals pose no such problems.

Of the various metals which can be diecast, zinc alloys are lowest in cost per pound and per casting. They are easy to cast, and cast at low temperatures; this means less fuel, lower die cost and reduced die upkeep.

Many Attributes—Zinc-base diecastings are strong. They can be held to very close tolerances. Should machining or finishing be required, the zinc alloys are easy to process. Very thin sections which in some cases rival those of stampings can be cast.

Resistance to surface corrosion is ample for a wide range of uses.

Exposure to ordinary atmosphere will tarnish the material. Prolonged contact with water or steam results in white corrosion products on the surface. But surface treatments are available to prevent such formations.

Easy to Choose—Two types of zinc alloys are now in widest use. These are ASTM XXIII (SAE 903), and ASTM XXV (SAE 925). Both are alloyed with the same elements and differ only in copper content.

Aluminum is most important among the alloying elements. It greatly increases strength and hardness of the base metal. It also makes for greater fluidity, which permits casting parts with intricate details and sharp outlines.

A further benefit of aluminum is that it reduces the alloy's rate of attack in dissolving iron from machine parts and dies. This greatly

General Limits of Diecasting

Type of Alloy (base metal)	Zn	Al	Mg	Cu
Maximum weight of casting, lb	30	10	6	5
Minimum wall thickness, inches:				
large casting	0.050	0.080	—	0.080
small castings	0.020	0.050	0.050	0.050
Minimum variation from drawing dimensions per in. of diam or length[a]	0.001[b]	0.002[b]	0.0015[b]	0.003[b]
Cast threads, maximum number per inch:				
external	24	20	—	10
internal	24[c]	none	none	none
Cored holes, minimum diam, in.[d]	0.031	3/32	3/32	1/8
Minimum draft, in. per in. of length or diam:				
on cores	0.003	0.015	—	0.020
on side walls	0.0005	0.010	—	0.020

[a] Expect larger variations across die partings or where slide or core fits are involved.
[b] Depends on conditions. [c] Where it may be cheaper than tapping.
[d] Depends a lot on core length; smaller holes than those listed are rarely used.

extends life of parts that come in contact with the molten metal. It also prevents the alloy from soldering to the die and other surfaces, and keeps the injection plunger from sticking to its cylinder.

Like aluminum, copper adds to strength and hardness of zinc-base alloys. Besides this, it improves corrosion resistance.

Makes It Stable — A small amount of magnesium is necessary to make the castings permanently stable. While its primary purpose is to delay certain structural changes in the alloy, its practical effect is to prevent intergranular corrosion. By so doing, it helps keep impact resistance up.

As to choice of alloy, it's largely a matter of mechanical requirements. The diecasting process by its very nature demands good casting qualities, so this aspect needn't be considered.

The real difference between the two zinc-base diecasting alloys lies in dimensional stability and how properties change upon aging, especially in humid atmospheres and at elevated temperatures. This difference is mainly a function of copper content.

In diecasting, the metal solidifies almost at once. Upon standing for a while, the casting undergoes phase changes which affect its properties.

Watch Shrinkage—The most important change that takes place right after casting is shrinkage. About two-thirds of it occurs within a few weeks. If the alloy contains copper, the initial shrinkage is followed after several months by an expansion that continues for a period of several years.

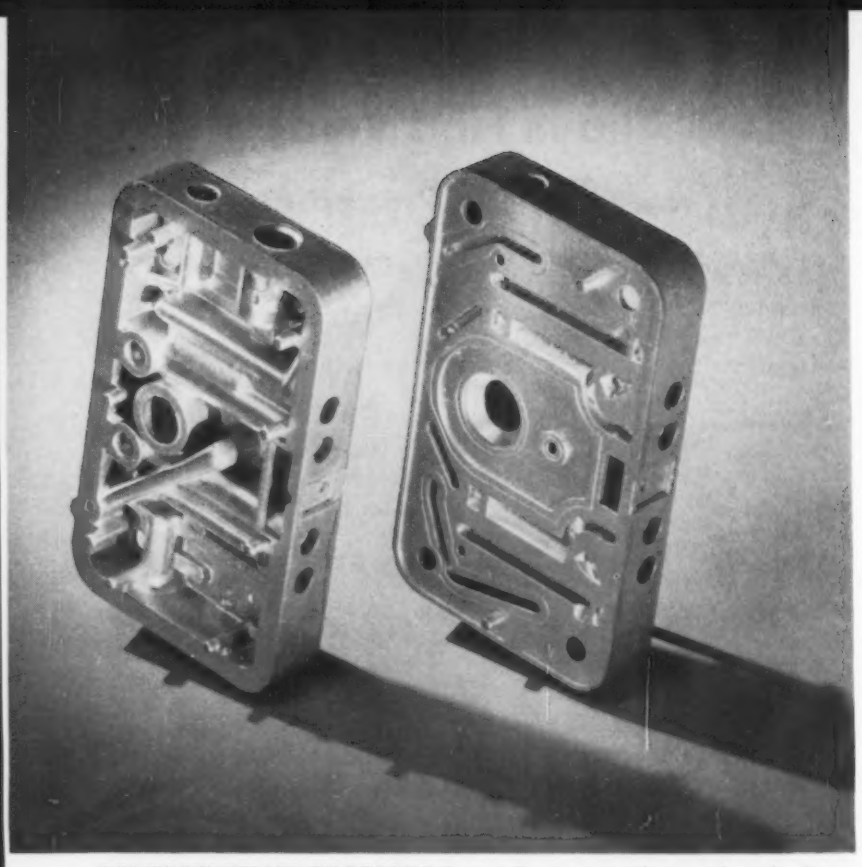
Actually, the dimensional changes aren't great. Unless the castings are quite large or require very close tolerances, the change can be virtually ignored.

Aging Affects Strength — Mechanical properties, however, undergo a fair amount of change

Two Alloys Find Widest Use

Here Are the Properties of Each

ASTM designation	XXIII	XXV
SAE designation	903	925
Composition, pct		
copper	0.10 max.	0.75 to 1.25
aluminum	3.5 to 4.3	3.5 to 4.3
magnesium	0.03 to 0.08	0.03 to 0.08
iron (max.)	0.100	0.100
lead (max.)	0.007	0.007
cadmium (max.)	0.005	0.005
tin (max.)	0.005	0.005
zinc (99.99+ pct pure)	balance	balance
Hardness, Bhn	74	79
Compression Strength, psi	60,500	87,300
Electrical Conductivity, microhms/cm³ at 20°C	157,000	153,000
Melting Point, °F	717.6	717.1
Modulus of Rupture, psi	95,000	105,000
Shearing Strength, psi	30,900	38,400
Solidification Point, °F	717.1	716.7
Solidification Shrinkage, in. per ft	0.14	0.14
Specific Gravity	6.6	6.7
Specific Heat, cal/g/°C	0.10	0.10
Thermal Conductivity, cal/sec/cm²/°C, x 10^{-6}	27.4	27.4
Thermal Expansion per °F, x 10^{-6}	15.2	15.2
Transverse Deflection, in.	0.27	0.16
Weight, lb per cu in.	0.24	0.24



COMPLEXITY NO PROBLEM: Integrally cast openings and projections simplify assembly and installation of diecast zinc carburetor parts. Intricate passages and details are cast to close tolerances, which in many cases do away entirely with costly machining and finishing work.

Temperature Affects Strength

Mechanical Properties	Test Temperature, °F					
	−40	−4	32	70	104	203
ASTM XXIII (SAE 903):						
Tensile Strength, 1000 psi	44.8	43.7	41.3	41	35.5	28.3
Impact Strength, ft-lb, ¼ x ¼ in. bars	2	4	23	43	42	40
Hardness, Bhn	91	87	82	82	68	43
Elongation, pct in 2 in.	3	4	6	10	16	30
ASTM XXV (SAE 925):						
Tensile Strength, 1000 psi	48.9	49.4	43.3	47.6	42.9	35.1
Impact Strength, ft-lb, ¼ x ¼ in. bars	2	4	41	48	46	43
Hardness, Bhn	107	104	99	91	89	62
Elongation, pct in 2 in.	2	3	6	7	13	23

after aging. Alloy XXV will lose up to 20 pct of its tensile strength and 15 pct of its impact strength at room temperature. It gets even worse if the casting ages at higher temperatures and in humid conditions; impact strength may drop to only 15 pct of the original value.

Alloy XXIII is somewhat more stable. At normal temperatures it keeps almost all of its impact strength and loses only about 20 pct of the tensile strength. Higher temperatures have only a slight effect.

Zinc-base alloys find wide use in automotive parts for carburetors, fuel pumps, horns, heaters, grilles, hubs, brackets, hardware and moldings; parts for washing machines, motors, vacuum cleaners, clocks, and kitchen equipment; parts for typewriters, recorders, cameras, vending machines, cash registers, and mixers; portable tools and machine tools; and in hardware and toys.

By means of a recent development in diecasting technique, it's now possible to cast articulated assemblies in one piece. The Intercast process, as it's called, does away with casting separate components and then assembling them with pivot pins or the like.

Small hinges, such as the type used on eyeglass frames, are typical of the sort of work turned out.

Acknowledgements—The editors are grateful to many persons and firms for helping make this feature possible. Special thanks for generous assistance go to Aluminum Co. of America, American Foundrymen's Society, American Smelting and Refining Co., The Dow Chemical Co., International Nickel Co., Kaiser Aluminum & Chemical Co., The New Jersey Zinc Co., and Reynolds Metals Co.

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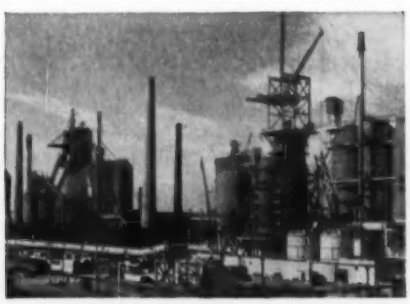

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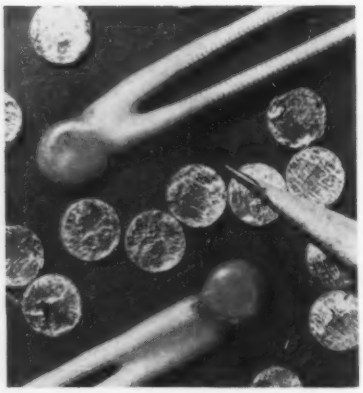
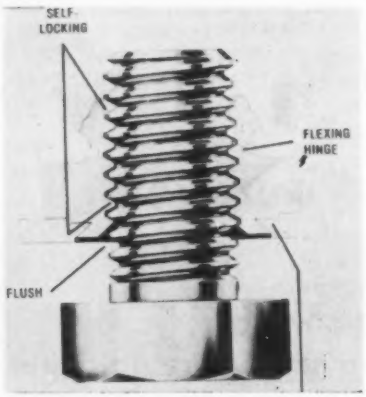
New Materials and Components



Tiny Thermistors Protect Electrical Equipment

Solid-state devices just perfected serve as tiny contactless thermal switches. The new type thermistors resist increases abruptly when a specified desired temperature is attained. In their first major industrial application, they provide practical, reliable, precise over-temperature protection of motors in large air conditioning and refrigerating systems. The thermistors' developer believes that they will find many uses in the company's own products, particularly where it's impractical to use bimetallic temperature-sensing elements. The devices can apply to any type motors. But they're particularly applicable to totally enclosed motors; such motors are used in hermetically sealed units for air conditioning and refrigeration. (Westinghouse Electric Corp.)

For more data circle No. 32 on Postcard, p. 153



All Metal Nut Is Self Locking, Self Clinching

All - metal and self - locking, this self-clinching nut for sheet metal fastening combines two functions in one lightweight unit. Its self-clinching design employs a clinching ring; when squeezed, this makes sheet metal flow around a back-tapered shank. This flow securely locks the fastener in the sheet with a flush fit on the reverse side. High torque, many times greater than the screw torque, and high pull out resistance result. The fastener's self - locking feature prevents relaxation or loosening in severe service. It also permits repeated re-uses without diminishing self-locking effectiveness. Made in both steel (with various finishes) and stainless steel, nuts fasten aluminum, magnesium, brass, copper, and cold rolled steel sheets. (Penn Engineering & Mfg. Corp.)

For more data circle No. 33 on postcard, p. 153

Variable Speed Drive Serves Agitators, Mixers

This packaged variable speed drive is recommended for agitators and mixer duty. It combines in a single integrated unit a high speed alternating-current motor, a mechanical type variable speed transmission and double reduction gearing. Being variable speed, the drive offers advantages where variations may exist in temperature, viscosity, batches or raw materials; or in pilot production to determine the exact speed required before a constant speed motor is installed. Extremely simple in operation and maintenance, this unit contains no electronic or direct-current components. It connects to any three-phase, alternating - current source. Several speed control methods are available: a handwheel on the unit, remote mechanical, remote electrical, or automatic control. With automatic control, drive speed automatically adjusts to meet viscosity changes of the material being mixed.

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COLLOIDAL GRAPHITE, MOLY-SULFIDE, VERMICULITE, AND OTHER SOLIDS

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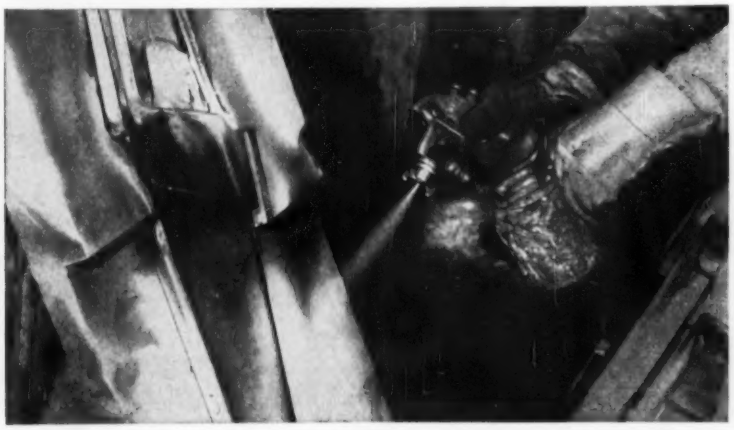
Die casters and molders are expressing a growing preference for Acheson 'dag' brand colloidal dispersions. The consistent high quality of these products and the multiple benefits they offer have obsoleted most other mold cavity coatings. As outlined below, Acheson dispersions greatly aid in the manufacture of more uniformly sound castings having smoother surface finishes, facilitate metal flow and parting, and consequently extend the effective service lives of the dies and molds on which they are used.



Acheson 'Prodag'®, spray-applied on permanent molds at Paragon Aluminum Corporation, has given them consistently higher quality castings and fewer rejects.

Better surface finish with 'Prodag' permanent mold coating is just one of the reasons why Paragon Aluminum Corporation, a Division of Detroit Harvester Company located at Monroe, Michigan, switched to this Acheson product. After four years of experimentation with other mold washes, Paragon chose 'Prodag' — Acheson semi-colloidal graphite in water — and has used it constantly the past seven years. The reasons for its choice are these; uniform consistency, excellent heat-transfer quality, and its hard, smooth, tenacious film which resists flaking and provides easier parting characteristics.

With about 95 per cent of its annual output of more than two million pounds of castings going to the automotive industry, Paragon must insist upon quality. 'Prodag' helps to maintain this standard. These parts for convertible automobile tops are precision-molded from both 355 and 319 aluminum alloy. Molds are preheated before each day's run to 600°F and the casting cycle maintains this temperature. The 'Prodag' dilution ratio is 1 to 4 parts water and is applied to the molds with a commercial spray gun. Aside from occasional touchup at points of greatest wear, this coating lasts through the entire run. Because of the physical contours involved in these comparatively small, light castings, they require rapid cooling in certain areas to insure uniform strength. The 'Prodag' coating — with its proven fast heat transfer ability — allows the castings to cool without breaks or pinholes. And by parting more easily, the high-finish castings which result have given Paragon Aluminum products wide acceptance in this demanding industry.

Typical parts cast at Paragon Aluminum include these automobile convertible top braces. More uniform strength, better finish, and fewer rejects result from this company's use of Acheson 'Prodag'.

If you have a metal casting problem, call in your Acheson Service Engineer. Or if you prefer, write direct for additional information contained in our Bulletin No. 425. Address Dept. IA-128.

'dag' and 'Prodag' are trademarks registered in the U.S. Patent Office by Acheson Industries, Inc.

Colloidal graphite increases die life because of its stability at high temperatures, excellent lubricating qualities, and its ability to prevent adhesion and the scrubbing effect of hot metal. This cannot be said of conventional petroleum compounds which either decompose rapidly at temperatures above 300°F or do not possess the required lubricity necessary under good die casting procedures. It will not volatilize when in contact with the hot metal and cause pock marks due to gas formation. It will perform when present in extremely thin films which will not affect dimensions or cause discoloration of the parts being cast. And since it does not volatilize or otherwise be destroyed in the casting process, it does not need to be applied as often as other lubricants. This fact alone has often increased production as much as 25%. Investigate the use of an Acheson colloidal dispersion in solving your die casting problem . . . *It probably is the very answer you need.*

ACHESON *Colloids Company*

PORT HURON, MICHIGAN

A division of Acheson Industries, Inc.

Also Acheson Industries (Europe) Ltd. and affiliates, London, England

50TH ANNIVERSARY

Offices In: Boston • Chicago • Cleveland • Dayton • Detroit • Los Angeles • Milwaukee New York • Philadelphia • Pittsburgh • Rochester • St. Louis • Toronto

Four Piece Assemblies at 600 per Hour With Kenco 15-Ton Electro-Safe Punch Presses

These two Kenco Presses each assemble four parts of electric irons at the rate of 600 components per hour at General Electric Company, Ontario, California. A third Kenco on the line assembles these components with a top plate. Parts are fed to the operators through hopper bins and assembled parts are carried away on a belt conveyer.

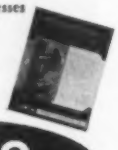
Kenco Electro-Safe Presses are used because of their unprecedented safety features and their ability to stay on the job — for maximum production. The press has no flywheel — in single stroke operation the press and motor go dead, eliminating double-tripping and stored-energy hazards. The operator must hold two widely spaced controls depressed to single trip the machine. A locking dial permits changing from "single trip" to "continuous trip" or "inching".

The Electro-Safe control can be connected to the die area to stop the ram on the downward stroke should any irregular feeding occur, thus protecting both the part and the die set. In addition, extra long ram guides keep perfect alignment which results in long die life, and many other exclusive features to keep them on the job.

You too can increase production with Kenco Presses — and at the same time increase profits. Can we give you additional information?

JOB FACTS:

Company: General Electric Co., Ontario, California
Machines: 3 Kenco 15-Ton Electro-Safe Punch Presses
Job: Assembling 4 Parts each for electric irons
Shifts: Up to 3 for 9 months.
Maintenance: Brake relined. Considerable Brake Failure
Production: 600 assemblies per hour
Remarks: "The presses are extra safe" and "Dies last longer".



2 Ton | 5 Ton | 8 Ton | 15 Ton | Deep Throat | Electro-Safe | Slow Speeds | Specials

KENCO
MANUFACTURING CO.
5211 Telegraph Rd., Los Angeles 22, Calif.

DESIGN DIGEST

Horsepower range is 3 to 30 hp; speed variations ranging from 2:1 to 7:1 are available; RPM range is 30 to 380. (U. S. Electrical Motors, Inc.)

For more data circle No. 34 on postcard, p. 153

Adjustable Sheave

Simple design is a key feature of a new stationary control, adjustable speed sheave. It's available for A, B and C section belts in two, three and four-groove construction. Design capacities to 75 hp are covered by 33 sizes. (Allis-Chalmers Mfg. Co.)

For more data circle No. 35 on postcard, p. 153

Heat-exchange Tube

U-bend heat exchanger tube in many standard and custom gages, diameters and lengths is now available directly from a major producer. It comes in a choice of uniform

IF IT'S A **RITCO FORGING**

Ritco also offers complete machining facilities and makes Special Fasteners and Upsets of ferrous and non-ferrous metals. Send us your requirements.

IT'S A CLEANER PART!

Faster assembly and minimum machining are but two of many savings you make when you specify Ritco "Bright Finish" Forgings.

Made to close tolerances, highly accurate Ritco Forgings have a smooth, flawless finish free of flash, voids or blow holes. They save hours of time and trouble on product finishing and assembly. You'll find, too, that their dense, fibrous structure and controlled grain flow add greater strength and toughness to points of shock . . . assure maximum impact resistance and fatigue strength.

Write Ritco into your product specifications now. Ritco Forgings are produced in a wide range of metals and alloys, and in many designs.

Send us your blueprints now for estimates at no obligation!

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Member Drop Forging Association
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gage, with thickened centers, or with thickened ends. Tube is bent, trimmed, hydrostatically tested, and reamed prior to shipment. It's shipped palletized with sizes arranged and labeled for optimum speed in on-site operations. Standard U-bend tooling accommodates straight lengths up to 75 ft in gages of 0.049, 0.065, 0.083, 0.095, and 0.109 in., in diameters ⅝, ¾, ⅞, and 1 in. (Chase Brass & Copper Co.)

For more data circle No. 36 on postcard, p. 153

Sound Muffler

Long lasting polyether foam enclosed in anodized aluminum provides a silencer for noises caused by exhausting air. It eliminates irritating sounds emitted by air operated devices. The new muffler is small in size. One model mounted

flush to a ⅛ or ¼-in. exhaust port protrudes only ¾ in. Another is only 1-in. long and will also accommodate ⅛ or ¼-in. exhaust ports. A larger size is 1¾-in. long and fits into a ⅜ in. port. Muffler is rustproof throughout and may be cleaned in most common solvents. (Mead Specialties Co.)

For more data circle No. 37 on postcard, p. 153

Wear-in Compound

A molybdenum disulfide "wear-in" compound reduces damage during breaking-in of new machinery. The new compound: (1) shortens the "wear in" period without use of abrasives; (2) reduces galling, seizing and excessive wear during this period; (3) need not be bur-

Ask Standard

how to cut costs with conveyors

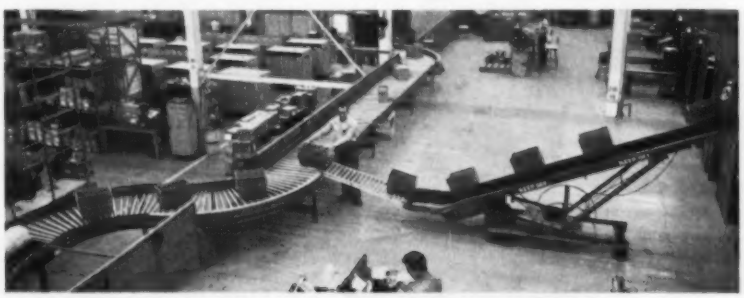
One of two Inclinebelt conveyors that carry parts to reversible live roller conveyor at second level. Belt conveyors are reversible to bring down outgoing parts. Note minimum space used for conveyors.

Multi-level conveyors help Douglas Aircraft CUT STORAGE AREA BY 2/3

When it's difficult to spread out — look up! That's what the El Segundo Division of Douglas Aircraft did when confronted with the need to triple the capacity of a parts stockroom facility.

Today, instead of stocking parts on one level, they're using three. Movement of parts in and out of all three levels is quick, simple and efficient. They're doing it with Standard conveyors.

This relatively simple solution to what could have been a difficult problem is one example of how Standard Conveyors pay off in every industry. STANDARD CONVEYOR COMPANY, North St. Paul 9, Minnesota. Sales and Service in Principal Cities.



Third level is reached via portable Handibelt conveyor from reversible live roller conveyor. Patented easy-adjustment features of Handibelt permit quick reversing of flow.

For details on Standard Conveyors, help in selecting the right type and size to meet your needs, contact the Standard representative listed in your classified phone book or write direct. Ask for Bulletin M-12.

Standard OVER 50 years of conveyor experience

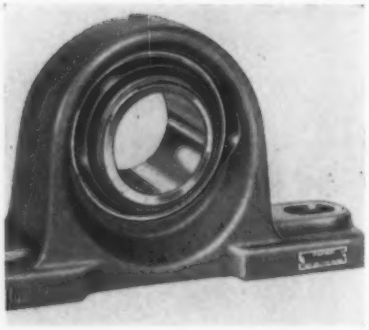
GRAVITY & POWER CONVEYORS

nished into surface for maximum effect. (Alpha-Molykote Corp.)

For more data circle No. 38 on postcard, p. 153

Re-lube Bearings

Two new series of ball bearing pillow blocks are relubricatable. One series is for standard service; the other, heavy-duty jobs. Both



lines incorporate integral seal bearings. All have a new housing design. This combines strength with over-all streamlined appearance. All units have same base-to-center-height dimension and bolt hole spacing as the manufacturer's older lines. Standard series models come in sizes up to and including 2 15/16 in. Heavy-duty ones come up to and including 3 15/16 in. (Fafnir Bearing Co.)

For more data circle No. 39 on postcard, p. 153

To Your DESIGN SPECIFICATIONS - From the Hand of the Specialist . . .

ERIE

Bolts • Studs • Cap Screws • Nuts

in Alloys • Stainless • Carbon • Bronze

Experienced hands . . . expert hands . . . hands grown competent by 45 years of the finest precision work. These are the hands of our specialists who meet your design and engineering specifications. Special Erie fasteners to meet the rigors of extreme temperatures, corrosion, tensile stresses are serving widely diverse industries the world over. Send your specifications to us, confident of the finished precision fasteners you expect.

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ERIE BOLT & NUT CO.

Erie, Pennsylvania

Representatives In Principal Cities

Nut, Lock-Washer

Semi-finished pre-assembled nuts and helical spring lock washers are combined into a single unit. These combination nuts and lock washers come in steel, brass, aluminum and

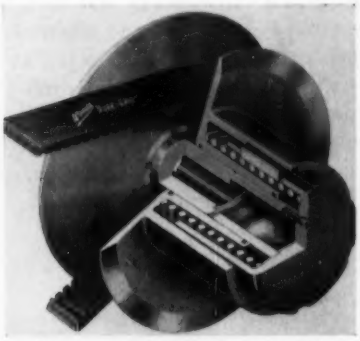
stainless steel in all commercial sizes. Production on highly automated equipment makes them available at relatively low cost. (Jacobson Nut Mfg. Corp.)

For more data circle No. 40 on postcard, p. 153

Self-lube Sheave

Variable-speed pulleys with a new design don't suffer from fretting corrosion, freezing or sticking. Bearing surfaces re-oil via an oil reservoir with each pulley rotation. Continuous rotating pump action of the flange hub on the sleeve constantly renews and evenly distributes the oil film on bearing surfaces. No keys obstruct oil flow around surfaces between the flange hub and sleeve. Nylon-faced rubber keys, located outside bearing surfaces, transmit power from the stationary to the moving flange through a removable sleeve cap. Use of oil lu-

bricant eliminates sticking; this might result from drying grease,

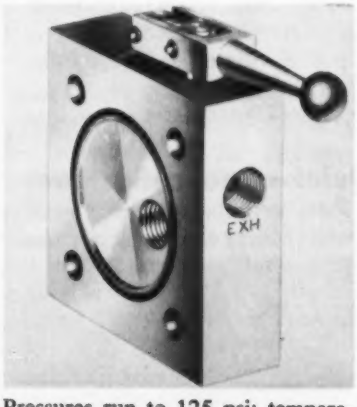


leaving a solid residum. (T. B. Wood's Sons Co.)

For more data circle No. 41 on postcard, p. 153

Thin Lever Valve

Lever-operated, this valve is only 1-in. thick, 3-in. wide. Streamlined in appearance, it mounts easily on machines and machinery where space is extremely limited. Such valves serve air, oil or water service.



Pressures run to 125 psi; temperatures to 150°F. Valves are available tapped for either ⅛ or ¼-in. pipe connection. Valve housing is milled from solid aluminum bar stock. (Hunt Valve Co.)

For more data circle No. 42 on postcard, p. 153

Spring Pins

A packaged kit is now available, containing more than 700 carbon steel spring pins in a variety of diameters. These include 1/16, 5/64, 3/32, ⅛, 5/32, 3/16, 7/32, ¼, 5/16, ⅜, and ½ in. Individual pieces range from 3/16 to 3¼-in. long and include a "practical mix" for machine shops, repair work and prototype or design groups. Pins

35% NICKEL

DURALOY

15% CHROMIUM

Furnace Castings

Here are two good examples of our work in high-nickel castings!

These are in the Duraloy HT group calling for Ni 33.37 percent. We've gone as high as 68% nickel on some castings where extremely high temperatures and very severe corrosive conditions had to be resisted. The important factor concerning castings for exceptionally high temperatures is that they must retain their structural form under load.

Knowing just how much nickel to put in and how much chromium and other alloying elements depends to a large extent on experience . . . and it is experience that we can offer you for the castings you need. We've been producing static castings since 1922 and centrifugal castings since 1933, being among the pioneer founders in each class.

If you would care to have our metallurgist study your casting problem, we shall be glad to have you call upon us for the service.

Our New General Catalog is Yours for the Asking

DURALOY Company

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ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

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COMPRESSION RIVETER DIES

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Write Dept. B for catalog 54 and new stock list.

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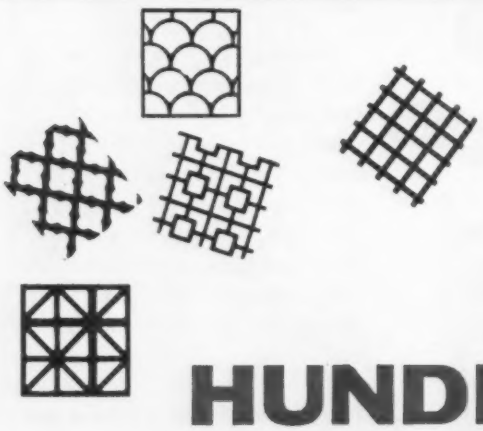

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Distillation Column Internals

DESIGN DIGEST

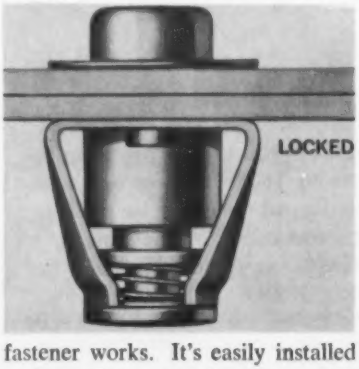
are slotted, chamfered, and heat treated. Pin diameter is slightly larger than the hole into which it's inserted, causing the pin to exert constant pressure against the hole wall. This prevents loosening even under severe vibration conditions.

Such pins serve as taper pins, straight pins, set screws, rivets, dowels, hinge pins, cotter pins or stop pins. (Elastic Stop Nut Corp. of America).

For more data circle No. 43 on postcard, p. 153

Quick-remove Fastener

Press to lock; press to unlock. This is the way a new quick-release



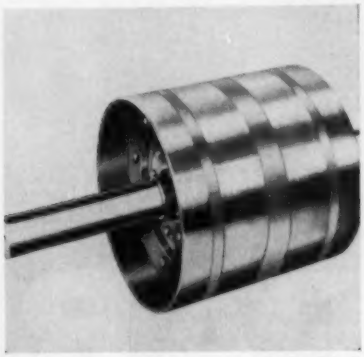
fastener works. It's easily installed and requires no tools of any sort. A press of the thumb is all that is needed. (Deutsch Fastener Corp.)

For more data circle No. 44 on postcard, p. 153

Magnetic Pulley

Powerful ceramic magnet material forms the heart of a new permanent magnetic pulley. Typical application is in reclaiming foundry sand. The pulley removes large and

small tramp iron particles from the sand. It returns a clean product for immediate re-use. Radial pole design of the magnet assembly produces a deep, powerful field. This blankets the conveyor burden, ef-

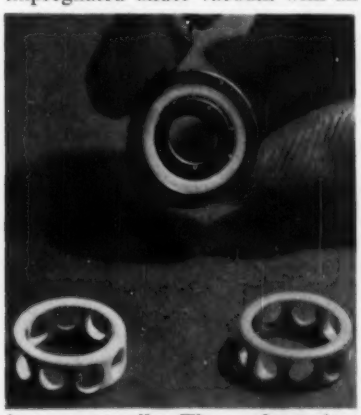


fectively pulling out imbedded tramp iron. Because it employs a truly permanent magnet, the pulley needs no energizing current, costs nothing to operate, requires no maintenance. (Stearns Magnetic Products).

For more data circle No. 45 on postcard, p. 153

Lubricates Bearing

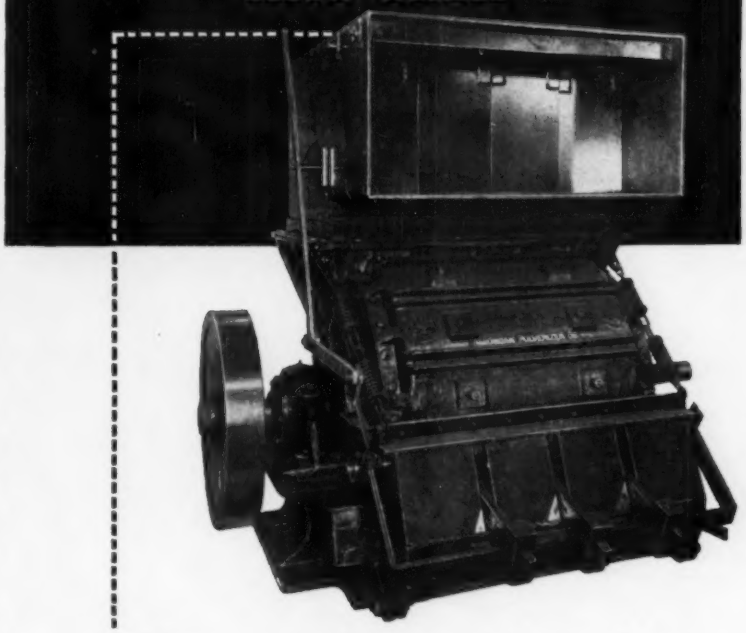
New ball retainers lubricate bearings in inertial guidance systems. Drastically reducing oil mass shifts in such precision ball bearings, each retainer is sintered from finely divided nylon powder. This is then impregnated under vacuum with an



instrument oil. The end product holds sufficient lubricant in its pores to operate the bearing at high speed for long periods. Tests indicate such bearings perform well for more than 5000 hours under severe preload and speed conditions. (The Barden Corp.)

For more data circle No. 46 on postcard, p. 153

convert metal turnings into cash

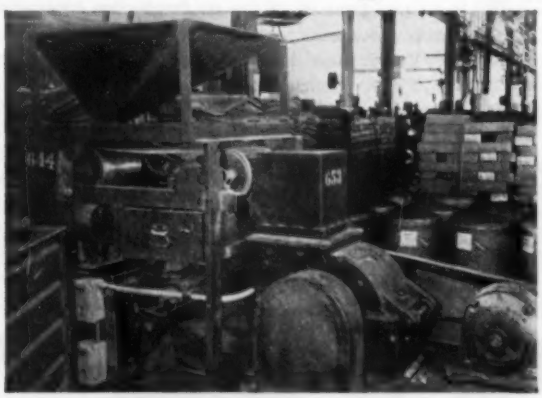


Long, curly, troublesome metal turnings, reduced in an American Metal Turnings Crusher, can produce additional profits for your plant.

Reduced to chip form, metal turnings bring $2 to $5 more per ton. Handling metal chips by shovel or pneumatic systems is easier, too, and chips require 75% less storage space than bulky machine turnings. You'll recover more cutting oil from chips . . . up to 50 gallons per ton! More important, American Metal Turnings Crushers pay for themselves and produce substantial profits for years to come. Models available with capacities ranging from 1 to 50 tons per hour. To get all the details, write American today.

reclaim fused welding flux

One industrial plant saved more than $10,000 a year by using an American Welding Flux Crusher to regranulate fused welding flux. Write American for details.



American PULVERIZER COMPANY

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RIVETING REVOLUTIONIZED by the PAR PROCESS!

PAR ... **Originated by TRS** with the invaluable collaboration of some of industry's top production engineers who sought a major break-through in the automation of assembly operations to reduce costs.

PAR ... **A name given by TRS to its Production Automated Riveting process** ... continuously developed and perfected for 3 years. Proved successful in some of industry's most efficient plants. Now, TRS has sufficient engineers especially trained in the PAR process to serve all manufacturers.

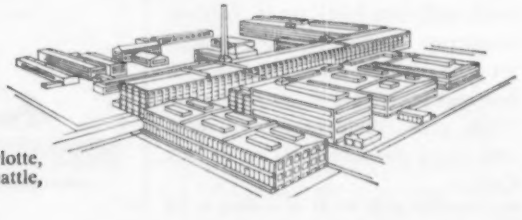
PAR ... **It makes riveting practically a new fastening method through efficiently integrated and automatic** ...

1. FEEDING of tubular rivets or related products.
2. TRANSFER of parts between riveter stations by means of sliding or rotating fixtures or dial tables. Or through synchronization with conveyors.
3. SEQUENCING the operation of from 3 to 15 rivet setters which make all fastenings simultaneously or in any desired sequence.
4. CONTROL of setting force as required by parts thickness or material characteristics.
5. SENSING of improper conditions and stopping equipment to avoid injury to parts, equipment or operator.
6. EJECTION of parts as required.

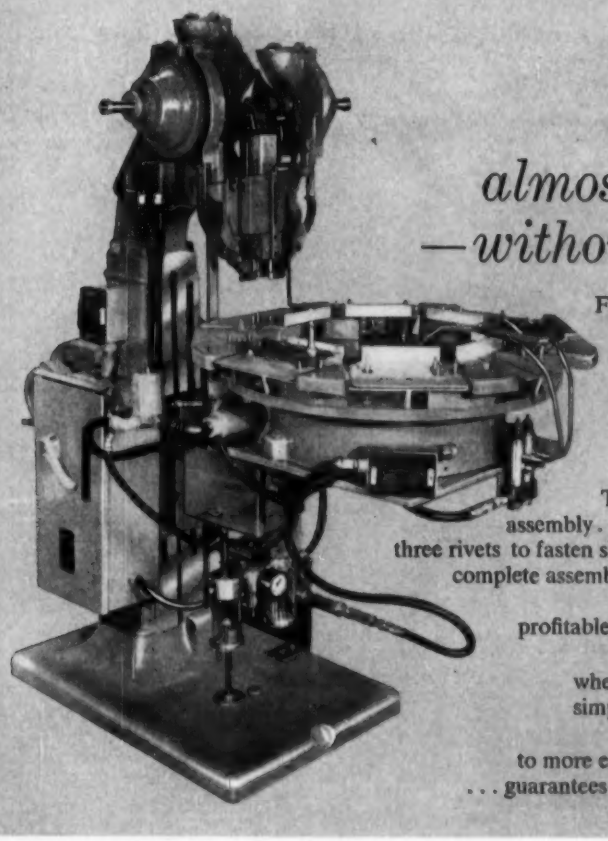
TRS®

TUBULAR RIVET & STUD COMPANY

QUINCY 70, MASS.



Midwest Office & Warehouse in Chicago. *Branches:* Atlanta, Buffalo, Charlotte, Dallas, Detroit, Indianapolis, Los Angeles, New York City, Philadelphia, Seattle, St. Louis. *See "Yellow Pages" for phone numbers.*



FORD

almost tripled production —without adding to payroll

Ford engineers wanted to step-up the production rate on a window gear and cam assembly. They called in TRS engineers.

Here is the remarkable automatic TRS Machine that resulted. Because center distances would not permit employment of a Multi-Head Riveter, a triple drive machine was adapted by TRS engineers. This eight dial station set-up receives a gear and cam assembly . . . greases it . . . receives a shaft and housing . . . sets three rivets to fasten shaft and housing to the gear and cam unit . . . ejects complete assembly. The machine does everything but load the parts. Ford Motor Company know-how shows in the profitable solution . . . so does TRS ingenuity and experience.

You get the benefit of TRS "recognized ability" when you buy any TRS Riveting Machine . . . from the simplest, standard type to a complicated special design.

TRS offers more machines, to more exactly meet your need . . . will lease but likes to sell . . . guarantees performance and sticks by you with all-out service.

PAR . . . It's a TRS Process for very good reasons!

Obviously, there are two critical elements in the PAR Process. Essential is the special and extensive knowledge and experience needed to design an integrated system of standard or multi-head riveters, feeders, transfers and controls for the particular assembly involved. Equally important are superior knowledge and experience in the design, tooling and application of Multi-Head Riveters because these are usually employed.

TRS originated Multi-Head Riveters over three years ago and is the only experienced source of these machines. Further, because this TRS development opened up new possibilities for automating the riveting process, TRS was able to begin three years ago to develop the special experience and application engineers required to fully meet the requirements of the PAR Process.

PAR . . . A New Opportunity to Reduce Direct Labor Charges

With this new help, hundreds of manufacturers . . . large and small . . . can effect substantial savings in direct labor charges, increase production rates, decrease parts spoilage and machine down-time. Look into it now if your product can be riveted, and especially if several rivets are involved.

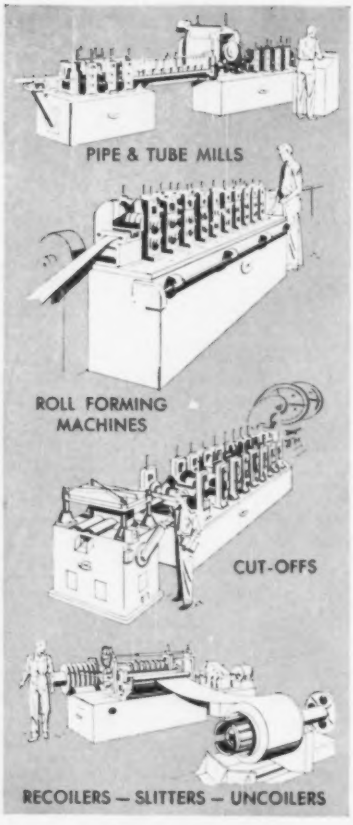
The yearly amortized cost of the TRS Multi-Head Riveter equipment is low because it will not be obsoleted by changes in product design or production line.

To save more . . . To protect against equipment obsolesence . . . don't buy any Riveting Machines until you investigate the PAR Process

You're not required to use TRS Rivets but you'll be better off if you do

There are no contracts or obligations involved in the PAR Process. However, it is true that the more automatic you make your riveting, the more important it is to use rivets that reduce operating troubles and machine down-time. And, we can give you good, factual reasons why TRS Tubular Rivets are more reliable in essential qualities and uniformity. Ask for the facts . . . judge for yourself.

Advt. Copyright by Tubular Rivet & Stud Company, 1958



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Uncoilers, slitters, roll-forming machines, cut-offs, pipe and tube mills, special machinery for ferrous or non-ferrous metals are all made and engineered by Yoder to fit your specific requirements.

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You Arbitrate It!

THE HEROES

From the files of
The American Arbitration Association

▪ During World War II a metals firm negotiated a contract providing 160 hours pay to employees with six month seniority who entered the armed forces. This clause was continued after the war because the draft was still on and young men faced several years of military service.

In 1955 Congress passed a law enabling boys under 18½ years old to enlist for three to six months active duty. The company normally didn't hire anyone young enough to have had six months' seniority by age 18½. So management didn't try to change the contract.

In 1957, President Eisenhower raised the maximum age limit to 26. Two employees in this age group volunteered for six months' duty. They immediately demanded the four weeks pay specified in the agreement.

Management Balks—"That provision of the contract was never intended to cover enlistments of only a few months," management said. "We would never have agreed to giving a man one-sixth of the pay he would have earned."

"The contract doesn't contain any qualifications as to the length of the enlistment," answered the union. "If you think it should, bring it up at the next negotiations. Meanwhile you have to pay these men."

The case finally went to arbitration. How would you rule?

The Arbitrator Ruled:

The arbitrator said: "I am not disposed to correct the parties' collective bargaining agreement by making allowances for unanticipated changes. There is no provision for reopening of this section and modification of the contract by the arbitrator is expressly forbidden. The arbitrator is therefore powerless to find other than that the 160 hours of pay shall not be withheld."

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

PHOTOS BY SPIEGEL

Snapshots from the

Alten Album of Industrial Products and Services

What counts most in a good casting? Experience or the scientific knowledge of today's metallurgists? It's an academic question at Alten where foundry men with thirty and forty years' experience work side by side with highly trained metallurgical engineers. The base casting being poured here will weigh approximately 2,100 pounds. Alten capacity extends to about 16,000 pounds. When you have a particularly large or difficult casting, gray iron or ductile, talk it over with an Alten engineer.

Need fast delivery on speed reducers? Most sizes of these popular Alten reducers are always available in stock. Feature one-piece housing and an exclusive magnetically operated oil cleaner-saver. Write for the Alten Speed Reducer folder.

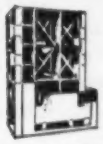
This industrial furnace is one of hundreds built in Alten's vast structural department. Alten has complete structural fabricating facilities. Ask the man from Alten for the complete story.

ALTEN

FOUNDRY AND MACHINE WORKS, INC., LANCASTER, OHIO

Ductile Iron Castings

Drums and Housings



Machine Tool Parts

Gray and Alloy Iron Casting

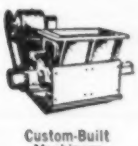
•

Parts or Assemblies

•

Engineering, Production, Inspection

Hydraulic Pumps and Valves



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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 153.

Rotameter

A new O-ring seal type rotameter is described in a specification sheet. It features Teflon tube adapters designed to permit the easy removal and interchange of different size metering tube. (Brooks Rotameter Co.)

For free copy circle No. 1 on postcard, p. 153

Sponge Iron

Converting iron ore into sponge iron is discussed in a brochure. It contains operating data from a 200-ton per day plant in Monterrey, Mexico. Here sponge replaces pig or scrap in making high-quality steel. (M. W. Kellogg Co.)

For free copy circle No. 2 on postcard, p. 153

Cabinet Ovens

Designed for laboratory and production use, new cabinet ovens come in horizontal and vertical air flow styles. They are made in 500°F, 850°F and 1000°F models. Literature gives details. (L&L Mfg. Co.)

For free copy circle No. 3 on postcard, p. 153

Job Shop

A folder lists tools, equipment and facilities at a plant available for manufacture of a wide variety of high precision parts, assemblies and complete machines for diversified industries. Plant has more than a million sq ft of space, 1200 machine tools, 3000 skilled employees. (Textile Machine Works).

For free copy circle No. 4 on postcard, p. 153

Miniature Switch

A data sheet describes a heavy-duty foot switch for use on machine tools, presses, motors, etc. It features a high electrical rating, oil-tight cast iron enclosure and protective toe guard. (Micro Switch Div., Minneapolis-Honeywell Mfg. Co.)

For free copy circle No. 5 on postcard, p. 153

Immersion Heaters

Immersion heaters for process use are covered in a bulletin. It shows how to get most service with least maintenance from industrial immersion heaters. (General Electric Co.)

For free copy circle No. 6 on postcard, p. 153

Slitting Equipment

Slitting equipment for coils and sheet stock is reviewed in a 4-page bulletin. Also included: recommended slitting procedures, suggestions on coil handling, width of cut, and use of entry and delivery pinch rolls. (E. W. Bliss Co.)

For free copy circle No. 7 on postcard, p. 153

Draft Fans

Heavy-duty mechanical draft fans are offered in an 8-page brochure. These centrifugal fans handle abrasive gases at high temperatures. They serve such uses as: ore sintering exhaust, rotary kiln exhaust, steel mill furnace circulation, and boiler gas recirculation. (Sturtevant Div., Westinghouse Electric Co.)

For free copy circle No. 8 on postcard, p. 153

U. S. Steel Uses Load-O-Matic for Heavy-Duty Scrap-Salvaging Operation

Westinghouse Load-O-Matic hoist control panel for this 125-hp, 25-cycle installation.

Hoisting a heavy roll-end hour after hour for crushing open-hearth slag during scrap-salvaging operation is rugged duty for any crane—and on this 60-ton Alliance crane Westinghouse Load-O-Matic* assures long, dependable operation at the United States Steel Corporation's Ohio Works.

Because Load-O-Matic is a heavy-duty, yet precision a-c crane system built to industry standards, it is highly favored for applications that call for unusual stamina, ease of operation and low-maintenance cost.

The Load-O-Matic system with stepless speed control over the full load range eliminates initial cost and complexity of d-c conversion equipment. Components, including controls, motors, brakes and gearing, are Westinghouse Power-Up products, built to work together and backed by Westinghouse unit responsibility.

To see Load-O-Matic in operation, call your local Westinghouse salesman. For more information, write Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pa. J1-96124

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BRANCHES: New York, Philadelphia, Chicago, Berkeley, Calif., Ft. Lauderdale, Fla.

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Conveyor Systems

Power and free trolley conveyor systems are covered in an 8-page brochure. It outlines free-running line branches from main circuit of power conveyors. (Conveyor Systems, Inc.)

For free copy circle No. 9 on postcard, p. 153

Instrumentation

Titled "Modern Precision," an 8-page company publication contains a round-up of instrumentation applications in Western states. (Leeds and Northrup Co.)

For free copy circle No. 10 on postcard, p. 153

Ultrasonic Cleaners

Mass produced but high quality ultrasonic cleaners are described in a 4-page catalog. Units range from 35-w to 2.5-kw systems. Related transducers range in capacity from ⅜ to 75 gal. (Narda Ultrasonics Corp.)

For free copy circle No. 11 on postcard, p. 153

Clutches, Brakes

Three new magnetic-friction clutches and brakes are announced in an 8-page bulletin. These include a flange-mounted brake, a flange-mounted clutch and a bearing-mounted clutch. They have torque capacities of .667 lb-ft, 5 lb-ft or 20 lb-ft. (Dynamatic Div., Eaton Mfg. Co.)

For free copy circle No. 12 on postcard, p. 153

Welded Rings

A 20-page booklet tells how one company produces welded rings and circular products. It reviews methods of forming bar stock. Then it covers: flash buttwelding of rings, quality control procedures, testing, heat treating, machining and surface treatment. Engineering and metallurgical facilities are also presented. Sizes and materials of flash-butt-welded rings available are also listed. (American Welding & Mfg. Co.)

For free copy circle No. 13 on postcard, p. 153

Space Heater

Portable space heaters are introduced in a catalog. Nine different models include ones with built-in thermostats. (Stow Mfg. Co.)

For free copy circle No. 14 on postcard, p. 153

Instruments

A 24-page catalog features scientific instruments. These include: amplifiers and voltmeters, fluxmeters, galvanometers, Kelvin and other type bridges. (Ealing Corp.)

For free copy circle No. 15 on postcard, p. 153

Powder Metallurgy

A new powder metallurgy publication features fabrication of cams and cam-like mechanisms. Technical and theoretical cam design is considered but main emphasis is on practical production problems. (Metal Powder Industries Federation.)

For free copy circle No. 16 on postcard, p. 153

Air, Gas Scrubber

A new air and gas scrubber is described in a bulletin. The unit's three-way scrubbing action traps non-condensable and normal dust-type materials below five microns in size. It uses a new approach to dust, fume and odor removal. (Johnson-March Corp.)

For free copy circle No. 17 on postcard, p. 153

Endless Belts

Catalog sheets are available on endless woven belts. (Arthur S. Brown Mfg. Co.)

For free copy circle No. 18 on postcard, p. 153

Control Systems

Photo-electronic integrated control systems are introduced in new literature. These systems can automate all plants, large or small, at

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51	52	53	54	55	56	57	58	59	60
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FREE LITERATURE

nominal cost, it says. Applications of the photoelectric and electronic controls are virtually unlimited. (Photoswitch Div., Electronics Corp. of America.)

For free copy circle No. 19 on postcard, p. 153

Pumps

Two types of ball bearing, horizontal split case pumps are covered in a bulletin. The double suction centrifugal pumps are for general water service. (Warren Pumps, Inc.)

For free copy circle No. 20 on postcard, p. 153

Sheet Notching

Notching operations are shown in a catalog which can be readily set up in stamping presses and press brakes in unlimited patterns. They handle short job runs or long production runs. The catalog covers 90° corner notching, louver notching, fulcrum notching for angles, and edge notching. (Wales-Strippit, Inc.)

For free copy circle No. 21 on postcard, p. 153

Plastic Parts

Design and manufacturing facilities for custom molding precision plastic parts are presented in a 4-page folder. It makes parts from all thermosetting materials. (Delta Plastics Co.)

For free copy circle No. 22 on postcard, p. 153

Digital Voltmeter

An AC/DC digital voltmeter is outlined in a bulletin. (Kin Tel Div., Cohu Electronics, Inc.)

For free copy circle No. 23 on postcard, p. 153

Control Valves

A 4-page bulletin describes surface wash water valves for filters. These valves control water flow to the filters. They easily open or close from an operating table in the usual manner. (Golden-Anderson Valve Specialty Co.)

For free copy circle No. 24 on postcard, p. 153

Metalworking

"Metalworking Profiles" is a 12-page booklet showing how a variety of companies use a firm's product. These include: electric furnaces, cranes, overhead handling systems, and a freight car mover for road or rail. (Whiting Corp.)

For free copy circle No. 25 on postcard, p. 153

Thermocouples

In 36 pages a catalog describes thermocouple assemblies and pressure sealing glands. (Conax Corp.)

For free copy circle No. 26 on postcard, p. 153

Teflon-lined Pipe

Chemically inert, corrosion proof Teflon lined pipe and fittings are presented in a 4-page bulletin. It details complete systems, including tees, short radius ells and reducing flanges. (Resistoflex Corp.)

For free copy circle No. 27 on postcard, p. 153

Electrical Cables

A 4-page folder lists cables for locomotives. Wiring can serve power, control or other essential circuits in new units or maintenance jobs. (Wire & Cable Dept., General Electric Co.)

For free copy circle No. 28 on postcard, p. 153

Metal Framing

Metal framing uses are discussed in a folder. It shows typical electrical and mechanical applications, and a myriad of uses as racks, shelving and partitioning. (Unistrut Products Co.)

For free copy circle No. 29 on postcard, p. 153

Instruments

Instruments and instrumentation systems are dealt with in a brochure. Its four pages highlight instruments for shock, vibration, pressure, inertial control, temperature and other devices for use as single components or in complete systems. (Gulton Industries, Inc.)

For free copy circle No. 30 on postcard, p. 153

Epoxy Compounds

Single component epoxy compounds recently announced are ready to use without hardening agents. Both filled and unfilled systems offer several degrees of flexibility and heat resistance exceeding 150°C. (Houghton Laboratories, Inc.)

For free copy circle No. 31 on postcard, p. 153

New Production Ideas

Equipment, Methods and Services

Press Brake Forms, Bends, Punches and Blanks

Capable of a variety of forming, bending, punching, blanking and related jobs is this versatile 15-ton power press brake. It's the latest addition to one maker's line, which includes 76 standard models; these range up to 900-ton units. In keeping with modern streamlined design, all driving parts are located inboard between housings for operating convenience, safety and compactness. Instant ram control enables smooth and sensitive jogging. This is assured by the machine's heavy-duty, synchronized friction clutch and brake. Simple construction and complete accessibility permit quick, easy replacement of long-lasting heavy-duty friction disks without disassembly of the clutch. Laminated non-metallic ways reduce wear, providing long service life. The unit has a movable foot treadle; this can be positioned where the operator desires. (Niagara Machine & Tool Works).

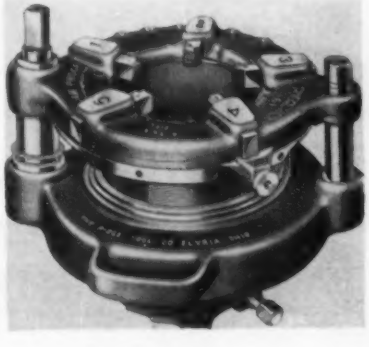
For more data circle No. 47 on postcard, p. 153

Tape Unit Searches, Picks One Job From 100

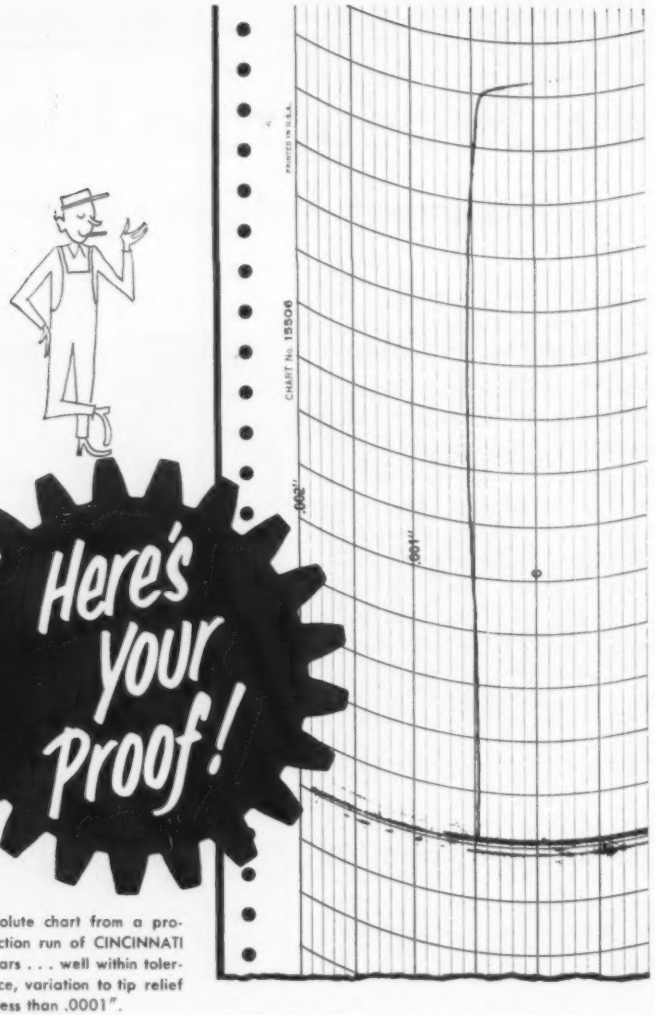
A tape search feature automatically selects up to 100 parts or part reference points on a new machine tool numerical control system. The tape search feature quickly selects any part program from a library of up to 100 parts stored on the tape reel. This permits inclusion of many parts on one reel. It eliminates changing tapes for each different part to be machined. Reduction in tape storage space requirements results. With the system, each part has a number. The operator, by setting two rotary switches, selects the part number to be machined. The machine control tape automatically repositions to the beginning of the selected program. In event of an emergency stop during machining, the reference search feature quickly assists the operator to regain synchronization between machine tool and the machine control tape. (Bendix Industrial Controls Section.)

For more data circle No. 48 on postcard, p. 153

Power Geared Pipe Threaders Will Not Jam



New 4 to 6-in. geared pipe threaders are jam-proof for safe threading with power drive. There are no dies to change. The tool threads four sizes (4, 4½, 5 and 6 in.) pipe or conduit with just one set of dies. They are cam activated and can't fall out. Size setting is said to be fast, easy and positive. Two spring knobs lock dies at each clearly marked thread size. A key feature is easy adjustment for straight or tapered threads. It's also fully adjustable for over or under size threads. No bushings are necessary. The tool's plate type workholder sets to size before the threader is placed on a pipe. Tightening a single screw secures the workholder to the pipe. Designed



Involute chart from a production run of CINCINNATI gears . . . well within tolerance, variation to tip relief is less than .0001".

The involute chart tells much about a gear. Accurately depicting tooth profile, this chart is interpretive of gear strength and ability to operate *quietly* with minimum wear. This chart is positive evidence of the degree of precision in gear manufacturing.

Involute charts are furnished at no extra charge with CINCINNATI gears . . . a part of our COMPLETE analytical inspection.

At Cincinnati Gear, the latest precision equipment enables us to make, inspect and *guarantee* custom gears—**and custom gear boxes.** We invite your inquiry.

CINTI® **GEARS,** *good gears only*

THE CINCINNATI GEAR CO.

Wooster Pike and Mariemont Ave. Cincinnati 27, Ohio

Custom Gear Makers Since 1907

NEW EQUIPMENT

for power drive or hand operation, it is regularly equipped with a ratchet handle. (Ridge Tool Co.)

For more data circle No. 49 on postcard, p. 153

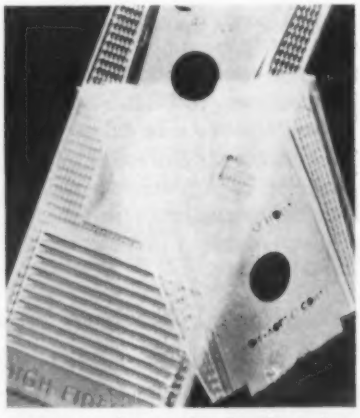
Oil Reclaimer

An oil reclaimer handles full-flow purification of lubricating and sealing oil in 28 high vacuum pumps. Total oil circulating rate is 224 gph. The reclaimer system, fabricated in two sections, consists of inlet and outlet oil pumps, vacuum pumps, an electrically heated vacuum vaporizer, a distillate tank and duplex fullers earth filters. Outstanding feature is its centrally located graphic control panel. Panel controls operate all pumps and indicate heater operation, solenoid positions, tank levels and flow characteristics. (The Hilliard Corp.)

For more data circle No. 50 on postcard, p. 153

Surface Protector

Protection of metal surfaces during and after forming is provided by a clear plastisol material. A polyvinyl chloride resin dispersion in a plasticizer, it forms a film which safeguards metal against corrosion and marring during metal forming



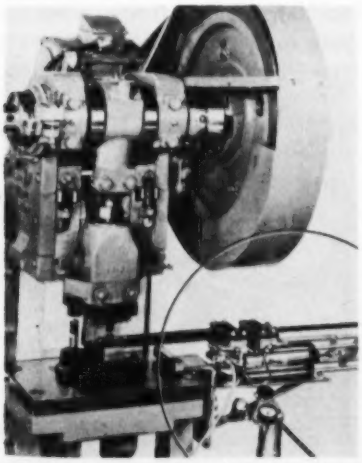
processes. It remains in place during even highly stressed drawing and punching operations. Yet, it's easily removable after this work is done. The material can be left on metal parts for removal by the ultimate user. This eliminates marring during transit. Fine machined parts,

such as gears, also can be protected against humidity and other hazards in handling and storage. Removal of the protective film is simply a matter of peeling it off after it has served its purpose. The coating applies by rolling, spraying, brushing, dipping, flow coating, etc. Then the coat is heated; it will not air dry. (The Sherwin-Williams Co.)

For more data circle No. 51 on postcard, p. 153

Stock Feed

Hand-fed punch press jobs can convert to safe, fast, automatic feed with a new portable, air-operated stock feed. The unit mounts in minutes without links or rods. Four standard sizes are available for use with almost any hand-fed punch press. It can easily be shifted from one machine to another as job requirements change. Entirely air

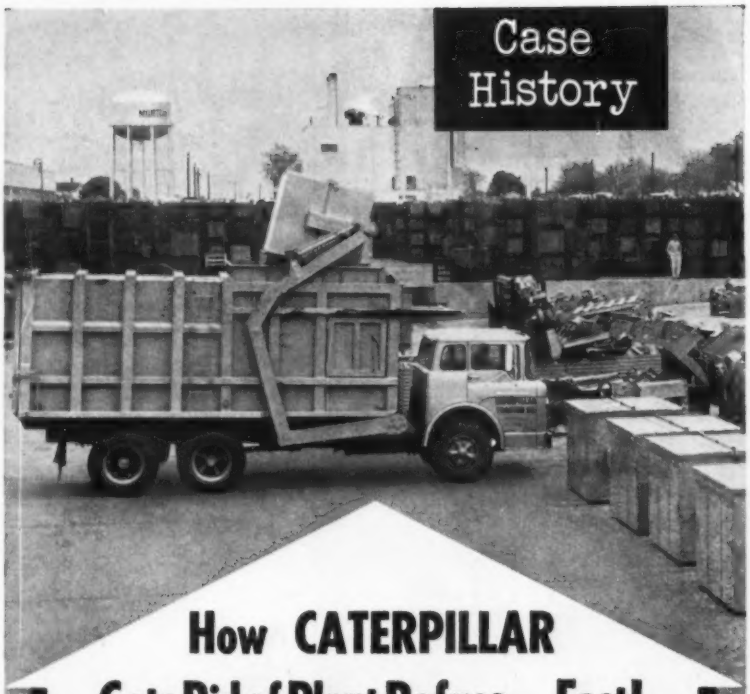


operated, it uses no solenoids. Thus no electrical connections are required. Air consumption is held to a minimum because power can be regulated for individual job requirements by means of a simple adjustment. Stock is inserted so easily that both strip and coil stock can feed efficiently. Stroke length readily adjusts on a built-in feed control stop. Feed tolerances may be held as closely as ± 0.002 in. (Cleveland Pneumatic Industries, Inc.)

For more data circle No. 52 on postcard, p. 153

Melting Furnaces

Radiant-fired, tilting, reverberatory furnaces melt aluminum for diecasting, permanent molding or



How CATERPILLAR Gets Rid of Plant Refuse... Fast!

At the Morton, Ill. Plant of the Caterpillar Tractor Co. huge quantities of trash and rubbish are generated at many indoor points every day. Containers are placed at these points, and as each is filled, a fork lift truck brings up an empty and carries the full one to the outside pick-up line. Here, the DEMPSTER-DUMPMASTER takes over. Moving down the line, the driver automatically dumps the contents of each container into the 24 cu. yd. packer body, where the material is compressed to a fraction of its former volume. This assures big pay-loads on every trip to the disposal area. Trash and rubbish are enclosed at all times . . . can't blow or scatter . . . fire hazard is reduced to a minimum.

THE DEMPSTER-DUMPMASTER

The DEMPSTER-DUMPMASTER is economical! One-man operation. Big pay-loads from 50 to 100 cubic yards. It's safe! Clearance lifting arms never pass the cab windows, can't injure the operator. It's versatile! Handles containers below grade or from docks. Can be used for manual loading routes. Containers available in one through six cubic-yard capacity, with or without casters.

Dept. IA-12, DEMPSTER BROTHERS, Knoxville 17, Tenn.

Mfd. By Dempster Brothers, Inc.

FREE 40 PAGE BOOK

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Knoxville, Tennessee

Please Send Without Obligation Your Booklet, "How to Reduce Waste Disposal Costs."

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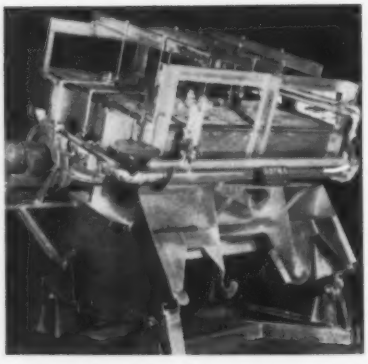
DEMPSTER DUMPSTER® SYSTEMS

sand casting operations. They also handle secondary scrap melting. A charging well, rather than a door, facilitates removel of iron or steel inserts in scrap diecastings. By placing a hook or other lifting device in the insert, it's easily removed when the aluminum casting has melted in the bath. Thin-section chips can also be economically remelted in the

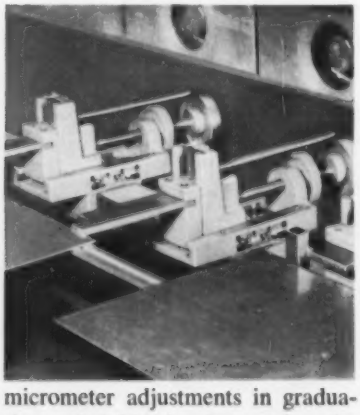


charging-well bath without excessive metal loss due to oxidation. The entire furnace rides on bearing-mounted rails and tilts through a 20° arc for pouring. A pushbutton-operated pneumatic cylinder controls tilting action. The ladle is hung from integral ladle arms and may be easily removed and transported by a revolving-head lift truck. (J. A. Kozma Co.)

For more data circle No. 53 on postcard, p. 153

Press Brake Gage

Trial and error set-ups are gone with a new press brake gage. The gage provides for safe and fast set-up and production. Time studies show it can save 75 pct of set-up time. Horizontal adjustment is by a hand wheel at the rear. Readings from zero to 3½ in. appear on a scale on the unit's right side. A lock nut (wheel) locks the reading. For fine adjustments, the lock nut releases; the user then can make



micrometer adjustments in graduations of 0.001 in. by turning the hand wheel. Vertical adjustment, to compensate for die height, is made by raising or lowering a front casting to desired height. A set screw locks this. In this casting is a ½ x ⅞-in. slot. This holds a magnetic sheet stopper. Two set screws hold this in position. It easily adapts to any press brake. (Addresso Mfg. Co.)

For more data circle No. 54 on postcard, p. 153

Truck Cranes

Three new truck cranes handle up to 200 ft of boom and jib. A 40-ton model lifts and handles, unassisted, 200 ft of an optional tubu-

NEW
miller
BALANCED WAVE
ELECTRIC CONTROL WELDER

Brings out BEST in TIG Welding

This new Miller development improves quality, speed and range of tungsten inert gas welding in all automatic fixture and manual applications. Balanced wave (BW) characteristic results from new Miller balance control which eliminates the d-c component present in most welding currents. Output of the Miller BW welder is ONLY pure a-c, DELIVERS:

Excellent arc stability
Maximum heat
Deeper penetration
Faster welding speeds

Complete particulars will be sent promptly upon request.

miller ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN
Distributed in Canada by Canadian Liquid Air Co., Ltd. Montreal

lar boom and jib. The 35-ton model and 30-ton model handle 180 and 160 ft respectively. The three truck cranes have power hydraulic controls, reversing clutches for either or both main drums, independent rapid boomhoist with boom lowering clutch, pin connected crane boom, swing brake, retractable high gantry and hydraulic counterweight removal jacks. (Link-Belt Speeder Corp.)

For more data circle No. 55 on postcard, p. 153

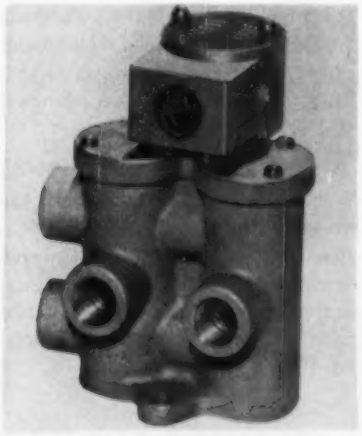
Hydraulic Cylinder

A new hydraulic cylinder delivers up to 385 tons of thrust. The 14-in. bore unit rates at 3000 psi for severe service operation, providing 231 tons of thrust. At its 5000 psi rating, for moderate service operation, the cylinder delivers 385 tons of thrust. All-Teflon seals prevent external leakage. Its case-hardened chrome plated piston rod has a self-regulating, wear compensating piston rod seal. Surfaces are rust resistant. It's available as a standard stock unit. (Miller Fluid Power Div.)

For more data circle No. 56 on postcard, p. 153

Air Valve

Cycling tests for new solenoids have passed the 100-million mark; they're still going strong without being touched. The new units feature waterproof coils. They have been incorporated on all standard four-way valves made by one firm. (Barksdale Valves).



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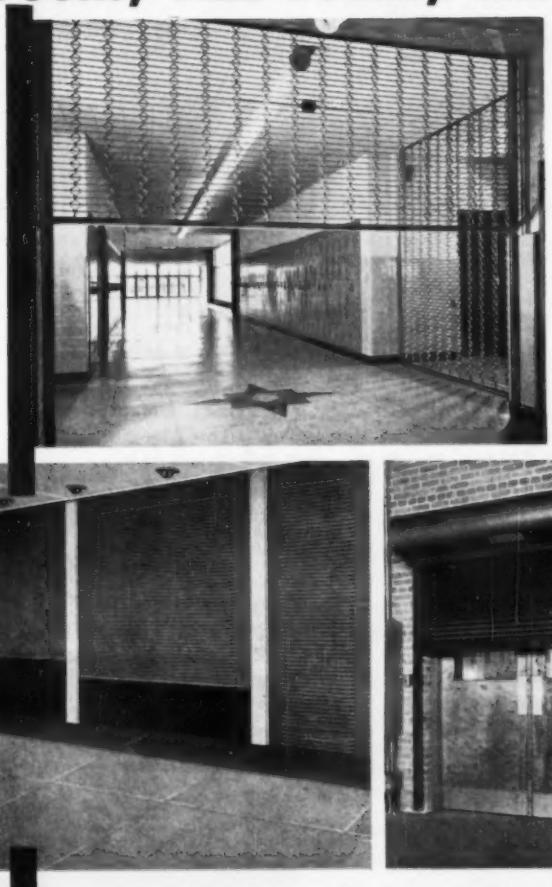
Best Answers for Doors, Passageways, Other Openings:

KINNEAR ROLLING DOORS,* FIRE DOORS, GRILLES



Coiling upward action is Kinnear's key to highest efficiency. It assures maximum space economy: *all floor and wall space around the opening is fully usable at all times.* Headroom and ceiling-space requirements are negligible (the barrel on which the closure coils when opened can in most cases be set within the wall either *below* ceiling height, *at* ceiling height, or *above* ceiling height). Motor, chain, crank or manual-lift is available, to suit any operating needs. In all cases, the closure rises completely out of the way when opened.

KINNEAR ROLLING DOORS protect openings with a continuous curtain of interlocking steel slats *(a Kinnear first)* — full door efficiency plus protection against wind, weather, intrusion, and fire.

KINNEAR ROLLING FIRE DOORS have features added to the steel-slat curtain operation that bring positive, automatic, safely controlled closure in case of fire, plus extra fire-blocking capacity approved by Underwriter's Laboratories, Inc.

KINNEAR ROLLING GRILLES, a combination of rugged steel bars and links fully protect openings against trespass, without blocking light, air, or vision.

All three of these Kinnear upward-acting closures can be used in various combinations, and are built to fit openings of almost any size. *Write today for full details.*

***Also doors of modified design, available as COUNTER SHUTTERS**

KINNEAR ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co.
FACTORIES:
1760-80 Fields Avenue, Columbus 16, Ohio
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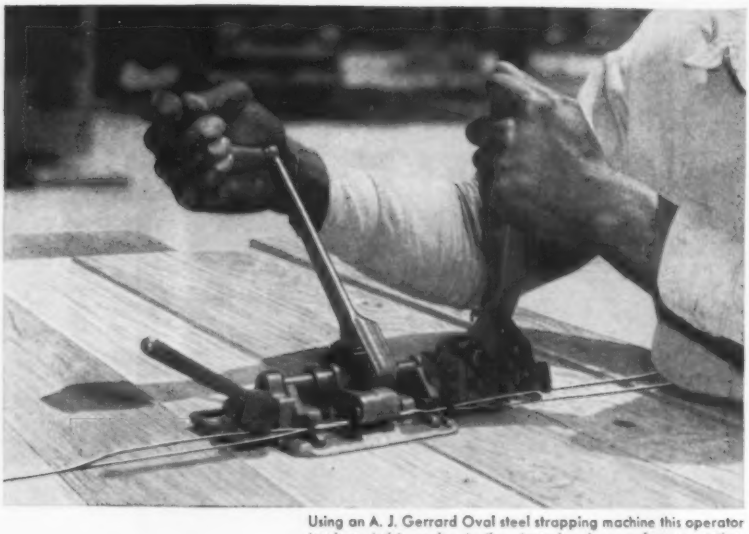

Using an A. J. Gerrard Oval steel strapping machine this operator tensions, twists and cuts the strapping in one fast operation.

Stahlman Lumber Company——

Cuts strapping costs 50%... time by over 12,000 hours!

"Costs less than half the price of other strapping materials. We started using A. J. Gerrard *Oval* steel strapping about two years ago, and have found that because of the much greater lineal feet per pound yield of Oval strapping, we get 50% *more* footage for approximately the same price as any other strapping material", reports W. J. McClain of Stahlman Lumber Co., Houston, Texas.

"Easier to use too! Our A. J. Gerrard strapping tool quickly tensions, twists and cuts the strapping in one fast operation. It's not only faster, but we've also found that we're saving two to three feet of strapping per package because of less waste."

"And the manpower we've saved! For example, because we now use modern strapping and handling techniques, an operation that used to take 4½ man-hours is now a 10-minute job. We figure we're saving about 12,480 man-hours per year."

Worth investigating. Clip the coupon below to your letterhead. Find out how *you* can use Oval steel strapping in your operations . . . how you can cut your strapping costs in half.

Oval steel strapping holds this huge load of lumber even in this stress position. This dealer finds A. J. Gerrard's Oval steel strapping cuts strapping costs 50%.

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1964 Hawthorne Court • Melrose Park, Illinois

☐ SEND DETAIL INFORMATION ON OVAL STEEL STRAPPING.

☐ I'M INTERESTED IN A COMPLETE STRAPPING SURVEY OF MY OPERATION.

NEW BOOKS

"Second International Conference on the Peaceful Uses of Atomic Energy, Geneva" edits proceedings of a Sept. 1958 gathering of atomic experts. To list all contents would take a booklet itself. There were 2500 papers delivered. This edited work consists of ten series; each series deals with a separate field. Probably the most interesting are: Series 5, Metallurgy & Fuels; 4, Technology & Engineering; 8, Nuclear Power Economics; and 2, Reactors. Since metalworking and nuclear engineering are often identical, importance of these works is obvious. Single volumes: $15 each. Set of all 12: $180. Pergamon Press, 122 E. 55th St., New York 22.

"Foundry Manual" is a how-to-do-it manual for U. S. Navy foundrymen. 291pp. $3 per copy. Supt of Documents, U. S. Govt. Printing Office, Washington 25, D. C.

"FAC Universal Construction Systems" tells you how to make precision working models of practically any machine, drive, or mechanism. These are kit-built. 80pp. $1 per copy. FAC Div., 9551 Grand River Ave., Detroit 4, Mich.

"Replacement Manual" sums up the Machinery & Allied Products Institute's equipment replacement policy. 75pp. $4 per copy. MAPI, 1200 18th St., N.W., Washington 6, D. C.

"Specification for Mild Steel Arc Welding Electrodes" and **"Specification for Low Alloy Steel Covered Arc-Welded Electrodes"** are joint preparations AWS and ASTM. 50¢ each. American Welding Society, 33 W. 39th St., New York 18.

"The Annealing of Low Carbon Steel" sums up a 1957 symposium. 138pp. $7.50 per copy. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

The Iron Age Summary

Watch Your Steel Inventories

Industry sources say steel inventories could be dangerously low at steel contract time next summer.

Inventory cutbacks during the recession were the biggest in history, according to estimates.

▪ Steel users could find themselves in a tight spot from an inventory standpoint about the time steel labor contracts expire next summer.

Metalworking plants have cut their stocks to the point where even the buildup now underway may not be enough to provide much of a safety margin in case of a strike in steel. The odds favoring a strike are about 65-35 at present.

Basis For Outlook—This appraisal of the outlook is based on estimates of steel analysts that steel inventories are now at their lowest point since before 1950. Even with an expected buildup of four million tons in the first half of 1959, steel stocks on July 1, when steel labor contracts expire, will be slightly less than they were at the end of the 1956 strike.

If there should be a strike, the poor inventory position of steel users will put pressure on steel firms for a prompt settlement. Industry sources say a steel strike could result in hardship for at least some steel comsumers within a 30-day period.

Inventory Cuts Were Deep—Metalworking plants went on their biggest inventory-cutting spree in history during the recent recession. It's estimated they cut their stocks by about 11 million tons. This compares with a reduction of about eight million tons during the '54 recession.

As a result, steel stocks at the start of the fourth quarter were estimated at 12 million tons—the lowest since before 1950, when the national economy was considerably smaller than it is today.

Buildup Is Underway — Steel users probably will add about a million tons to their inventories during the fourth quarter, and another four million tons during the first two quarters of 1959.

If this forecast holds true, the metalworking industry will find itself with slightly less inventory on July 1, when steel labor contracts expire, than it had at the end of the 1956 strike. At that time, steel stocks were estimated at about 18 million tons.

Shortage Could Develop—Some steel men even foresee the possibility of short-term shortages if industry tries to rebuild its stocks at a faster pace than expected during the first half of next year.

According to one expert, all products made from slabs could tighten quickly. That would include plates, sheets, and tinplate. Bars and structurals are less likely to be in short supply, even temporarily.

Steel Orders Improve—Inventory rebuilding will pick up considerably after the turn of the year. Steel order books already have begun to reflect this as well as the steady improvement in the over-all business picture. The auto companies are playing a leading role in this reversal of inventory policy.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,025	1,985	2,025	1,792
Ingot Index (1947-1949=100)	125.1	123.6	125.1	111.5
Operating Rates				
Chicago	85.0	85.0	88.0	72.0
Pittsburgh	71.5	69.0*	68.5	66.5
Philadelphia	70.5	68.0	71.0	84.0
Valley	54.0	52.5*	59.5	57.0
West	84.0	82.0*	80.0	80.0
Cleveland	74.0	70.0*	71.0	67.0
Buffalo	66.0	66.0	78.0	63.5
Detroit	92.0	95.0*	90.0	89.0
South	65.0	62.5	56.5	67.0
South Ohio River	81.0	80.0*	89.0	72.0
Upper Ohio River	85.5	84.5*	88.0	63.0
St. Louis	82.0	83.0*	92.0	60.5
Aggregate	74.5	73.5	74.5	70.0

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.42
Scrap No. 1 hvy (Gross ton)	$39.83	$40.17	$42.33	$32.00
No. 2 bundles	$28.17	$28.33	$29.50	$24.00
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	28.10
Copper, electrolytic	29.00	29.00	29.00	27.00
Lead, St. Louis	12.80	12.80	12.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.375	99.25	99.75	92.50
Zinc, E. St. Louis	11.50	11.50	11.50	10.00

Control Makers Fight Cost Rise

Despite rising costs, builders of electrical and electronic controls are trying to keep prices in line.

But odds indicate some small price increases are likely next year.

▪ Makers of electrical and electronic controls, caught in a highly competitive market, are battling to hold the price line.

They are even hoping to stimulate sales by some price reductions. But the odds are against them. Rising material and labor costs are exerting pressure for price increases, not cuts.

Small Increases Likely—The general prediction is that price rises are probably inevitable next year. But manufacturers will try to keep them small. And the equipment makers are not yet ready to discount the prospect of price cuts in some product lines.

During the current year, sales of controls are following the general misfortune of the economy. And they've been particularly close to those of the machine tool industry. However, there are signs an upturn started at the end of the third quarter.

As one manufacturer describes it, the controls industry is "standing under the tree, and it looks like the apples are about to fall."

Sales Rise Expected—Manufacturers have pretty well written off the first nine months of 1958. They are now looking for a rise for the remainder of the year to the level of "normal" 1957.

So far, controls makers say, they are abreast of industry's demands. And in many cases, they believe, they are ahead of industry. One controls manufacturer explains: "We're able to offer more than customers seem willing to buy."

This is, of course due to the high price tags on systems to control complex processes. Sometimes, even today, such cost isn't justified. But there are signs automatic controls are becoming less costly—particularly for the less complex systems.

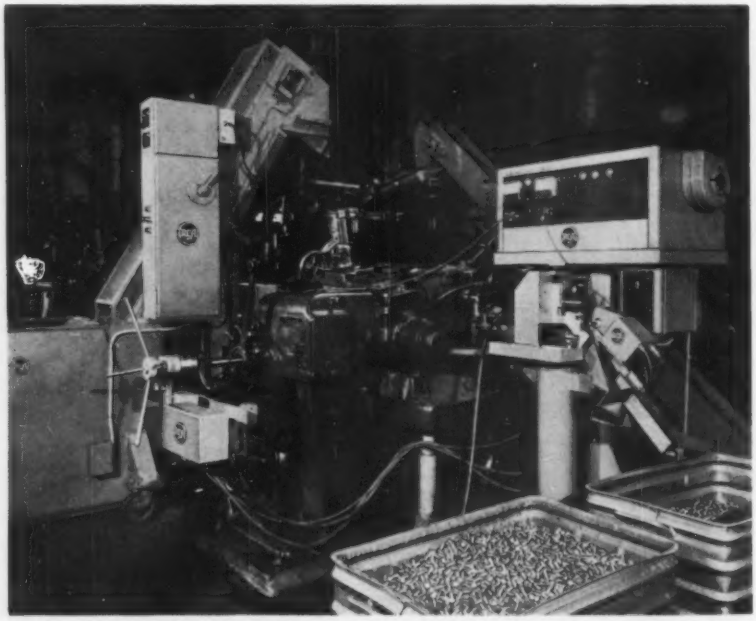
Reasons for Buying—The high cost of putting out defective parts is becoming increasingly important as an incentive for manufacturers to switch to electrical or electronic manufacturing controls.

Mass production industries with national product distribution are beginning to find this particularly burdensome.

Consequently, a number of controls makers believe metalworking firms can find it more profitable to avoid failures. This means greater emphasis on quality.

Industry Needs Studied—While office computers and electronic office devices are similar in function and design to industrial electronic systems, the industrial environment differs markedly from the office environment. This difference poses a number of manufacturing and application problems not encountered in commercial systems.

This basic difference prompted some 10 to 15 leading "systems" firms to recently explore the possibility of setting up an "Automatic Systems Section" of the National Electrical Manufacturers Association.



SALES DRIVE: Controls makers are out to convince buyers electrical and electronic systems pay production dividends. (RCA photograph)

Monuments in a new world.....

Valley ingot moulds are designed for individual steel plant conditions. These moulds meet today's metallurgical requirements

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High Court Reverses Memphis Decision

Supreme Court overturns lower court ruling which had stymied natural gas projects and cut linepipe demand.

Pipe mills hope decision will revive sales of linepipe, plate, and oil country goods.

■ The U. S. Supreme Court has reversed the Memphis decision.

In a 5-3 decision the High Court has upheld the Federal Power Commission's short-cut method of granting rate increases in natural gas pipeline cases. The action overturns an appeals court ruling (the Memphis decision) which prevented the FPC from granting increases without lengthy approval processes or consent of pipeline users.

The Memphis decision had stymied natural gas development and drastically reduced demand for linepipe. If the original ruling had stood pipeline companies might have needed years to secure higher rates.

The Supreme Court decision may now signal the delayed start of several hundred million dollars worth of pipeline projects. Steel producers believe it is too early for a definite reaction. But mills hope the reversal will increase demand for linepipe, plate, and oil country goods. The Memphis ruling was credited with knocking one million tons of linepipe out of 1958 steel production.

But, the issue may not be completely settled. The minority opinion, written by U. S. Supreme Court Justice Douglas, is an open invitation for further action. It could encourage opponents of the ruling to seek legislation from Congress to override the Court.

Stainless Plate Discounts — Mill efforts to get rid of jobber discounts on stainless plate orders are failing. In fact, three mills—Crucible Steel, U. S. Steel, and Republic Steel—are again offering jobbers a 5 pct allowance.

The new allowance covers orders shipped direct from mills to customers. The producers handle all the billing. The 5 pct is solely a bonus to jobbers for help in getting the order. Mills hope the system will make it difficult for jobbers to split commissions with buyers.

For U. S. Steel the commission represents a change in policy. Early this fall USS announced three changes in stainless plate pricing: (1) cuts in base prices; (2) revisions in extra charges; and (3) elimination of jobber discounts.

Some producers, while following the price changes, did not discard the dealer discounts. Others did.

Sheet and Strip — Automotive steel buyers have tipped off mills they intend to build inventories after the first of the year. At one **Midwest** mill the tonnage from automotive accounts in January is double that of December. Other producers say the automakers are also trying to boost some December orders. Among all sheet buyers, mills report, there's more advance buying.

Chicago sheet mills are still operating about 21 turns a week. There's still active discussion there of first quarter allocation of cold-rolled sheet.

Plate—Mills still have plenty of slack time. Some are operating below 15 turns a week. A few are even on 10 turns a week. But some plate buyers are showing an interest in advance ordering. One **East Coast** mill has tonnages booked all the way to June, 1959 from a few regular buyers.

The outstanding plate market at the moment is **Chicago.** Buyers there are busy booking first quarter orders. Two reasons are given for the latest upsurge: (1) Some buyers believe early ordering will help them beat a second quarter rush for plate; and (2) an early 1959 spurt in linepipe orders could tighten plate supplies.

Bar—December orders for hot-rolled bar are coming into the mills slowly. The month will probably show a slight decline from November levels. At the moment mills believe January sales should about equal November. An upswing is expected in February and March. **Cleveland** and **Chicago** areas are more active than **Pittsburgh** and the **East Coast.**

Pipe and Tubing — Oil country seamless orders continue to bump along while users liquidate inventories. Since October about half the pipe used has come out of oil company stocks. And there's still no clear sign that the inventory paring is ended.

Wire Products—Industrial wire sales are increasing on buying from automakers, furniture builders, and spring makers. Further gains are in prospect through the first quarter of next year. Customer stocks are believed low and mill salesmen expect inventory building soon.

PURCHASING AGENT'S CHECKLIST

Buying surge for durable goods could follow present revival in consumer confidence. **P. 89**

How to get more from your metalworking dollar — nonferrous castings. **P. 122**

What's new in materials and components? See new features—Design Digest. **P. 138**

COMPARISON OF PRICES

(Effective Dec. 9, 1958)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Dec. 9 1958	Dec. 2 1958	Nov. 11 1958	Dec. 10 1957
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	4.925¢
Cold-rolled sheets	6.275	6.275	6.275	6.05
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.60
Hot-rolled strip	5.10	5.10	5.10	4.925
Cold-rolled strip	7.425	7.425	7.425	7.17
Plate	5.30	5.30	5.30*	5.12
Plates, wrought iron	13.55	13.55	13.55	13.15
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.425¢
Cold finished bar	7.65	7.65	7.65	7.50
Alloy bars	6.725	6.725	6.725	6.475
Structural shapes	5.50	5.50	5.50	5.275
Stainless bars (No. 302)	45.00	45.00	45.00	45.00
Wrought iron bars	14.90	14.9½	14.90	14.45
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	7.65¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.525
Light rails	6.725	6.725	6.725	6.50
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$77.50
Slabs, rerolling	80.00	80.00	80.00	77.50
Forging billets	99.50	99.50	99.50	96.00
Alloy blooms, billets, slabs	119.00	119.00	119.00	114.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.15¢
Skelp	5.05	5.05	5.05	4.875
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	5.967¢

Finished Steel Composite

Weighed index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

	Dec. 9 1958	Dec. 2 1958	Nov. 11 1958	Dec. 10 1957
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.51
Foundry, Southern Cin'ti	73.87	73.87	73.87	71.65
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.01
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.42
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$42.50	$42.50	$45.50	$32.50
No. 1 steel, Phila. area	*33.50*	34.50	39.00	33.00
No. 1 steel, Chicago	43.50	43.50	42.50	30.50
No. 1 bundles, Detroit	35.50	34.00	37.50	21.50
Low phos., Youngstown	43.50	43.50	46.50	32.50
No. 1 mach'y cast, Pittsburgh	51.50	51.50	51.50	50.50
No. 1 mach'y cast, Phila.	*48.50*	49.50	49.50	50.50
No. 1 mach'y cast, Chicago	53.50	53.50	53.50	40.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	*$39.83*	$40.17	$42.33	$32.00
No. 2 bundles	*28.17*	28.33	29.50	24.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.50	$15.38
Foundry coke, prompt	$18-18.50	$18-18.50	$18-18.50	$17.50-$19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.00	29.00	29.00	27.00
Copper, Lake, Conn.	29.00	29.00	29.00	27.00
Tin, Straits, N. Y.	99.375†	99.25	99.75	92.50
Zinc, East St. Louis	11.50	11.50	11.50	10.00
Lead, St. Louis	12.80	12.80	12.80	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	33.00

† Tentative. ‡ Average. * Revised.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scraps delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDEX TO PRICE PAGES

Prices at a Glance 161
Comparison of Prices 165
Bars 174
Billets, Blooms and Slabs 172
Boiler Tubes 176
Bolts, Nuts, Rivets, Screws 177
Clad Steel 176
Coke 176
Electrical Sheets 176
Electrodes 176
Electroplating Supplies 177
Ferroalloys 179
Iron Ore 176
Merchant Wire Products 176
Metal Powders 177
Nonferrous
- Mill Products 171
- Primary Prices 165, 170, 171
- Remelted Metals 171
- Scrap 171

Pig Iron 178
Piling 172
Pipe and Tubing 175
Plates 174
Rails 176
Refractories 176
Service Center Prices 177
Shapes 172
Sheets 173
Spring Steel 176
Stainless 178
Steel Scrap 168
Strip 172
Structurals 172
Tinplate 173
Tool Steel 176
Track Supplies 176
Water Pipe Index 177
Wire 174
Wire Rod 173

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ADVANTAGES

- 1 Lifter handles wide range of coil sizes
- Requires minimum of only 10" to 12" between piles —saves storage room
- 1 man operation — eliminates hookers
- Positive grip on coil — no damage to material

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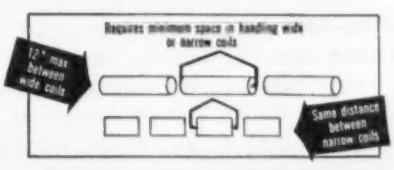

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Buying Tapers Off, Prices Weaken

A year-end lull is closing in on the scrap market. Some hope is seen for January.

Scrap men hope to revive sales through joint meeting with U. S. officials and steel companies.

■ The scrap market is approaching the end of the year in a weakened condition.

Prices in most districts are either falling or barely holding steady. Mill demand is low and is expected to remain low for the balance of 1958.

One notable exception is cast iron scrap. Pipe mills and automotive foundries are buying cast grades at a healthy rate.

As openhearth scrap prices generally hit their lowest level since last July, members of the Institute of Scrap Iron and Steel met in Washington, D. C., with Office of Civilian Defense Mobilization officials to decide what can be done to revitalize the scrap industry.

While steel production climbed about 59 pct from April to October, scrap sales to mills are up only 31 pct. It's the first time scrap business has not followed the mill operating rate, and dealers worried, says the Institute.

This year, scrap sales are expected to reach about 20 million tons, compared to 36 million in 1957 and almost 40 million in 1956. And export is down about 50 pct from last year.

No plan of action was decided at the Washington meeting, but another talk is expected to take place in about four weeks. Steel companies may be invited to sit in.

Meanwhile, The IRON AGE heavy melting Composite Price edged downward 34¢ to $39.83.

Pittsburgh—Prices of most grades are resting on bottom. Trading has come to a standstill. Two small orders placed this month have been cleaned up and there is little chance of new buying before the New Year. Railroad specialties were down sharply on an early list. Turnings are down $1. While the market is weak, anticipation of better business in January may tend to check further price drops. Price of No. 2 heavy melting was incorrectly shown last week at $42 to $43. The correct price was $35 to $36.

Chicago—A series of blizzards has slowed down collections here. The major effect has been to hold scrap prices in line. At least one mill purchase of factory bundles pulled the bottom of the price spread for that grade down. But other mills in the area are buying factory bundles at stronger prices. New railroad lists continue moving at unchanged prices.

Philadelphia—Small quantities of openhearth scrap and turnings have been sold at $1 under last week's prices. The exceptions were No. 1 dealer bundles, which held steady, and shoveling turnings, down $2. Only malleable iron, which is scarce in this district, showed strength. It jumped $3.

New York — The market continues weak. There is no domestic demand. A few brokers report slight export activity. But in general, prices must be considered nominal.

Detroit—Dealer scrap moved to local mills and into Canada during the past week at prices close to November levels, causing prices to move upwards. The turnings market is dead after dropping $1 a week ago.

Cleveland—Steel scrap demand is weak with little chance for revival this month. After industrial and railroad tonnages are absorbed by mills, only small amounts are left for dealers.

St. Louis—The flow of scrap has decreased slightly. The tonnages mills are taking are at quoted prices. Inventories are high and little change is expected in the market for the rest of the month.

Birmingham—Re-entry of a large electric furnace mill into the market was about the only scrap activity this week. A few pipe mills are buying limited quantities of cast.

Cincinnati — Dealer yards are fairly well cleaned out after a good November shipping month, so most aren't too anxious to sell now. Local mills are taking scrap but are not anxious for it.

Buffalo — The market is depressed with little relief seen before the end of the year. All turnings prices and cast iron borings are off $1.

Boston—Openhearth scrap prices dropped $1 in a quiet market. Stove plate also dropped $1. The price of No. 2 bundles is nominal.

West Coast—A surge of Japanese export orders sent prices for top steelmaking grades up $3 to $4 in San Francisco and Los Angeles. Eight or 10 cargoes are scheduled to be taken on here during the first quarter, 1959.

Houston — There is no market here. Lack of demand justified a $1 drop in openhearth scrap prices and sharper decreases in cut structural plate and cast grades. Only shoveling turnings held steady.

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SCRAP PRICES *(Effective Dec. 9, 1958)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	42.00 to 43.00
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. punch'gs plate	48.00 to 49.00
Heavy turnings	36.00 to 37.00
No. 1 RR hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	54.00 to 55.00
Rails 2 ft and under	57.00 to 58.00
RR specialties	48.00 to 49.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids	225.00 to 230.00
18-8 turnings	125.00 to 130.00
430 bundles and solids	125.00 to 130.00
410 turnings	50.00 to 60.00

Chicago

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	43.00 to 44.00
No. 1 factory bundles	47.50 to 49.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	23.00 to 24.00
Low phos. forge crops	52.00 to 53.00
Low phos. punch'gs plate	48.00 to 49.00
Low phos. 2 ft and under	46.00 to 47.00
No. 1 RR hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	52.00 to 53.00
Rerolling rails	63.00 to 64.00
Rails 2 ft and under	59.00 to 60.00
Angles and splice bars	54.00 to 55.00
RR steel car axles	71.00 to 72.00
RR couplers and knuckles	51.00 to 52.00
No. 1 machinery cast.	53.00 to 54.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	41.00 to 42.00
Cast iron wheels	42.00 to 43.00
Malleable	56.00 to 57.00
Stove plate	44.00 to 45.00
Steel car wheels	52.00 to 53.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	130.00 to 135.00
430 bundles and solids	115.00 to 120.00
430 turnings	65.00 to 70.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	18.00 to 19.00
Mixed bor. short turn.	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Clean cast. chem. borings	32.00 to 33.00
Low phos. 5 ft and under	38.00 to 39.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	29.00 to 30.00
RR specialties	43.00 to 44.00
Rails 18 in. and under	57.00 to 58.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	40.00 to 41.00
Cast iron car wheels	44.00 to 45.00
Malleable	59.00 to 60.00
No. 1 machinery cast.	48.00 to 49.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.50 to $36.50
No. 2 hvy. melting	30.50 to 31.50
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. 18 in. and under	45.00 to 46.00
Rails, random length	49.00 to 50.00
Rails, 18 in. and under	55.00 to 56.00
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast.	39.00 to 40.00
Drop broken cast.	47.00 to 48.00

Youngstown

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	29.00 to 30.00
Machine shop turn.	19.50 to 20.50
Shoveling turnings	19.50 to 20.50
Low phos. plate	43.00 to 44.00

Cleveland

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	29.50 to 30.50
No. 1 dealer bundles	37.50 to 38.50
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	25.50 to 26.50
No. 1 busheling	37.50 to 38.50
Machine shop turn.	15.50 to 16.50
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	20.50 to 21.50
Cast iron borings	20.50 to 21.50
Cut structural & plates, 2 ft & under	46.50 to 47.50
Drop forge flashings	37.50 to 38.50
Low phos. punch'gs plate	38.50 to 39.50
Foundry steel, 2 ft & under	39.00 to 40.00
No. 1 RR hvy. melting	45.00 to 46.00
Rails 2 ft and under	56.00 to 57.00
Rails 18 in. and under	57.00 to 58.00
Steel axle turnings	25.00 to 26.00
Railroad cast.	50.00 to 51.00
No. 1 machinery cast.	49.00 to 50.00
Stove plate	45.00 to 46.00
Malleable	61.00 to 62.00
Stainless	
18-8 bundles	215.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 busheling	34.00 to 35.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	15.00 to 16.00
Low phos. plate	39.00 to 40.00
Structurals and plate, 2 ft and under	44.00 to 45.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	56.00 to 57.00
No. 1 machinery cast.	48.00 to 49.00
No. 1 cupola cast.	44.00 to 45.00

St. Louis

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	22.00 to 23.00
No. 1 RR hvy. melting	45.00 to 46.00
Rails, random lengths	47.00 to 48.00
Rails, 18 in. and under	52.00 to 53.00
Angles and splice bars	46.00 to 47.00
RR specialties	46.00 to 47.00
Cupola cast.	48.00 to 49.00
Heavy breakable cast.	38.00 to 39.00
Cast iron brake shoes	38.00 to 39.00
Stove plate	42.00 to 43.00
Cast iron car wheels	44.00 to 45.00
Rerolling rails	59.00 to 60.00
Unstripped motor blocks	39.00 to 40.00

Birmingham

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	13.00 to 14.00
Electric furnace bundles	38.00 to 39.00
Elec. furnace, 3 ft & under	35.00 to 36.00
Bar crops and plate	43.00 to 44.00
Structural and plate, 2 ft.	43.00 to 44.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	44.00 to 45.00
Rails, 18 in. and under	49.00 to 50.00
Angles and splice bars	45.00 to 46.00
Rerolling rails	54.00 to 55.00
No. 1 cupola cast.	52.00 to 53.00
Stove plate	53.00 to 54.00
Cast iron car wheels	41.00 to 42.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	23.00 to 24.00
No. 2 dealer bundles	17.00 to 18.00
Machine shop turnings	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Clean chem. cast. borings	25.00 to 26.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	185.00 to 190.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	33.00 to 34.00
Drop forge flashings	32.00 to 33.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Heavy breakable cast.	33.00 to 34.00
Mixed cupola cast.	41.00 to 42.00
Automotive cast.	46.00 to 47.00
Stainless	
18-8 bundles and solids	205.00 to 210.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	24.00 to 25.00
Machine shop turn.	7.00 to 8.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	31.00 to 32.00
Heavy breakable cast.	29.00 to 30.00
Stove plate	29.00 to 30.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	$32.00 to 34.00
No. 2 bundles	22.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 cupola cast.	45.00

Los Angeles

No. 1 hvy. melting	$37.00
No. 2 hvy. melting	35.00
No. 1 dealer bundles	$33.00 to 34.00
No. 2 bundles	20.00
Machine shop turn.	15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Elec. furn. 1 ft and under (foundry)	48.00
No. 1 cupola cast.	45.00 to 47.00

Seattle

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 2 bundles	22.00
No. 1 coupla cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

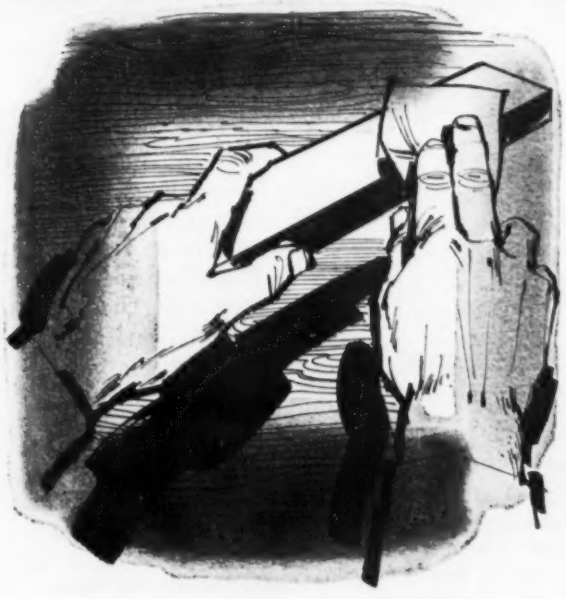
No. 1 hvy. melting	$34.50
No. 2 hvy. melting	30.50
No. 1 dealer bundles	34.50
No. 2 bundles	25.00
Mixed steel scrap	26.50
Bush., new fact., prep'd.	34.50
Bush., new fact., unprep'd	28.50
Machine shop turn.	15.00
Short steel turn.	19.00
Mixed bor. and turn.	15.00
Rails, rerolling	39.00
Cast scrap	$39.00 to 41.00

Houston

Brokers buying prices per gross ton on cars:

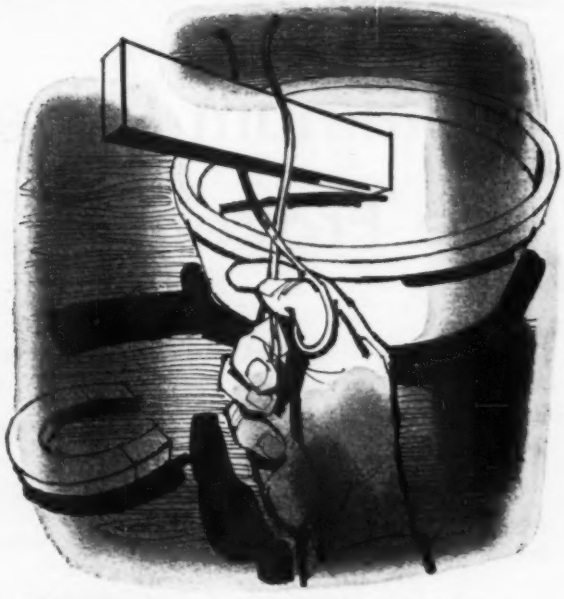
No. 1 hvy. melting	$38.00
No. 2 hvy. melting	32.00
No. 2 bundles	23.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$40.00 to 41.00
Unstripped motor blocks	33.00 to 34.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	28.50 to 29.50

S-E-G-R-E-G-A-T-E-D SCRAP IS WORTH MORE



Rub specimen with emery paper to obtain clean surface.

Add 1 drop of 1:1 Nitric Acid. If there is no attack the material is stainless steel.



Test sample with magnet. Non-magnetic results indicate sample is one of the 18-8 stainless steels.

Place specimen in 1:1 solution of Muriatic Acid at temperature of 180/190° F. After 5 minutes, if specimen is coated with a heavy black smudge, it is probably TYPE 303.

Here is how to test for

STAINLESS STEEL TYPE 303

This general purpose chromium nickel steel is popular because of its free machining characteristics. Since it has less tendency to seize or gall, Type 303 is used for bolts, nuts, fastenings and equipment such as pumps, valves, and shafts where movable steel surfaces are in contact. However, because of its higher sulphur and phosphorus content and the fact that as scrap it is frequently contaminated by grease and oil, it is essential to keep it separate from other stainless steel scrap.

Segregated, 303 has value. Mixed with other stainless steel scrap, it not only loses its own worth but spoils the premium value of the entire lot of scrap with which it is mixed. Such a mixture cannot be used in the carefully calculated charges of an electric furnace.

For scrap of known analysis, our personnel, equipment, experience and strategically located facilities are specifically geared for the purchase or sale of dependably segregated metals. We welcome your inquiry.

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Aluminum Prices Are Frozen

Aluminium Ltd. started the ball rolling by dropping the 60-day protection clause as of Jan. 1.

This, and other reasons, promoted a complete price freeze through June 30.

▪ Aluminium Ltd. decided to change a clause in its order contract, with which it wasn't quite satisfied. But before the industry had finished reacting the entire aluminum price picture had been changed.

Now, the current prices on all primary aluminum, alloys, and mill products from producers are frozen. They will apply to all orders shipped before July 1, 1959. Traditionally, the buyer paid the price in effect on the day of shipment.

Started—Initially, the Canadian producer dropped the 60-day protection clause. Under this clause an order placed before a price hike, and shipped within 60 days after the rise, was honored at the lower rate. But the company said it would ship any order placed in December on the current price until July 1. Aluminium sells only primary metal in the U. S.

Reynolds went along with the Canadian move, but extended it to all products. Alcoa said this would require "tons of paperwork." It foresaw quantities of large blanket orders being placed this month to get the guarantee. Specifications, they figured, would be left blank and filled in later, or changed before actual shipment. Alcoa went all the way, and the others followed.

Against Clause — The 60-day protection clause turned out to be more of a problem than an asset to fabricators. Many of them complained because their customers assumed they were covered for all requirements and refused to swallow a higher price until the grace period ran out.

Also, while all producers featured the protection clause, it appeared to collide more with the Canadian producer's way of doing business. Aluminium has the reputation for being less ready to adjust a contract than U. S. producers. For instance, one fabricator says that on the last price hike U. S. producers permitted some shipping dates to be moved on orders placed before the move, but for delivery after the grace period. Aluminium, he says, usually insisted on the original terms.

Trigger—Actually, the Aluminium move was more the trigger than the main cause of the move, according to some sources. Rumors have been circulating that producers were planning a price hike, either this month or certainly the first quarter. Producers denied it. Still the rumors persisted.

With markets gaining strength, and several major new applications poised ready to take substantial tonnages, stability is rated as more important.

Lead and Zinc

Key men in both the American Zinc Institute and the Lead Industries Assn. are optimistic about the future of their metals.

John L. Kimberley, executive vice president of the zinc group, told a meeting of stockholders of the Matthiesson & Hegeler Zinc Co. that the consumption of zinc in the U. S. has resumed its upward trend.

And Robert L. Ziegfeld, secretary-treasurer of the lead association, announced that spending for lead research in 1959 will be more than four times what it was in 1958. And the budget for market development and technical service has been souped up by about 50 pct.

Mr. Kimberley looked to galvanizing sales as a "sound index." He quotes a "reliable steel industry source" that consumption of galvanized steel sheet will exceed 4 million tons in 1965. Total was 3 million tons in 1956.

Off — Latest report from Mr. Kimberley's statistical dept. shows shipments from smelters in November were down slightly from October, 83,606 tons from 93,244 tons. However this was still the second best month of 1958.

Tin prices for the week: Dec. 3—99.00; Dec. 4—99.00; Dec. 5—99.25; Dec. 8—99.25; Dec. 9—99.375.*

* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E).	29.00	27.50	10/23/58
Copper (CS)	29.00	29.50	11/29/58
Copper (L)	29.00	27.50	10/23/58
Lead, St. L.	12.00	12.30	10/14/58
Lead, N. Y.	13.00	12.50	10/14/58
Magnesium ingot	36.00	34.00	8/13/58
Magnesium pig	36.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	182-182	165-205	11/3/58
Zinc, E. St. L.	11.50	11.00	11/7/58
Zinc, N. Y.	12.00	11.50	11/7/58

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 171.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size*	¼	5/16-½	⅝-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	....	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	53.13	.....	50.36	53.32
Brass, Yellow	46.57	47.11	46.51	49.98
Brass, Low	49.23	49.77	49.17	52.54
Brass, R L	50.17	50.71	50.11	53.48
Brass, Naval	51.24	.....	45.05	54.65
Munts Metal	49.35	.....	44.66	.....
Comm. Bz.	51.65	52.19	51.59	54.71
Mang. Bz.	54.94	.....	48.64	.....
Phos. Bz. 5%	72.52	.....	73.09	.....

Free Cutting Brass Rod 31.22

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $8.50-$10.10; alloy, $15.95; Plate, HR, commercially pure, $6.00-$6.75; alloy, $8.75-$9.50. Wire, rolled and/or drawn, commercially pure, $6.50-$7.00; alloy, $10.00-$11.50; Bar, HR or forged, commercially pure, $5.10-$5.50; alloy, $5.10-$6.35; billets, HR, commercially pure, $3.80-$4.35; alloy, $3.80-$4.20.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex. . 29.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb cont'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.45
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb) ....$2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 35.00 to 42.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz. ...$70 to $80
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $224 to $228
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz...$15 to $17
Platinum, dollars per troy oz...$50 to $55
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 90.125
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 28.00
No. 120 ..... 27.00
No. 123 ..... 26.00
80-10-10 ingot
No. 305 ..... 32.25
No. 315 ..... 30.25
88-10-2 ingot
No. 210 ..... 39.75
No. 215 ..... 35.50
No. 245 ..... 32.25
Yellow ingot
No. 405 ..... 23.00
Manganese bronze
No. 421 ..... 24.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.75-25.00
0.60 copper max. 24.50-24.75
Piston alloys (No. 122 type)..24.25-25.25
No. 12 alum. (No. 2 grade) 21.50-22.00
108 alloy 22.00-22.50
195 alloy 25.00-26.00
13 alloy (0.60 copper max.)...24.25-24.75
AXS-679 (1 pct zinc) 21.75-22.25

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 22.50-23.50
Grade 2—92-95% 21.25-22.25
Grade 3—90-92% 20.25-21.25
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	25	24¼
Yellow brass	19	17¼
Red brass	22⅛	21⅝
Comm. bronze	22⅞	22⅛
Mang. bronze	17⅝	16⅞
Free cutting rod ends.	18¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 24¼
No. 2 copper wire 23¾
Light copper 20¾
*Refinery brass 23¾
Copper bearing material 21¼
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 24¼
No. 2 copper wire 23¾
Light copper 20¾
No. 1 composition 19
No. 1 comp. turnings 18½
Hvy. yellow brass solids 14¼
Brass pipe 15¾
Radiators 15¾

Aluminum

Mixed old cast. ..... 12 —13
Mixed new clips ..... 15 —16
Mixed turnings, dry ..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 21½—22
No. 2 copper wire ..... 19½—20
Light copper ..... 17½—18
Auto radiators (unsweated). 13¼—13¾
No. 1 composition ..... 16½—17
No. 1 composition turnings.. 15½—16
Cocks and faucets ..... 13½—14
Clean heavy yellow brass ... 11¾—12¼
Brass pipe ..... 13½—14
New soft brass clippings .... 14 —14½
No. 1 brass rod turnings .... 11½—12

Aluminum

Alum. pistons and struts .... 6 — 6½
Aluminum crankcases ..... 10 —10½
1100 (2S) aluminum clippings 13 —13½
Old sheet and utensils ..... 10 —10½
Borings and turnings ..... 6½— 7
Industrial castings ..... 10 —10½
2020 (24S) clippings ..... 11¼—11¾

Zinc

New zinc clippings ..... 4¾— 5¼
Old Zinc ..... 3½— 3⅝
Zinc routings ..... 2¼— 2½
Old die cast scrap ..... 2 — 2¼

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 37-40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 30-32
Clean Monel turnings 30-33
Old sheet Monel 26-28
Nickel silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 8 — 8¼
Battery plates (dry) ..... 2¾— 3
Batteries, acid free ..... 2½— 2¾

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixer common babbitt ..... 9½—10
Solder joints ..... 13¼—13¾
Siphon tops 42
Small foundry type ..... 10¼—10¾
Monotype ..... 10½—10¾
Lino. and stereotype ..... 9½— 9¾
Electrotype ..... 8½— 8¾
Hand picked type shells .... 6½— 7
Lino. and stereo. dross ..... 2¾— 3
Electro dross ..... 2¼— 2½

(Effective Dec. 8, 1958)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B5*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST &	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.00 *G4*		
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.00 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*			5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.00 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *F3*	7.575 *W3*	10.00 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$113.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Dec. 8, 1958)

STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. *COKES: 1.50-lb. add 25c. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65c.		
	Claymont, Del.												
	Conteaville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A1*	6.275 *A1*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*	6.875 *G2*							$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.215 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *W5, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective Dec. 8, 1958)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B5*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B5*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.475 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6*	6.425 *B2*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.675 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Dec. 8, 1958) * Special Quality.

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

(Effective Dec. 8, 1958)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate 15 pct	Plate 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 38.75; 1 side, 33.10.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25			15.35
Cleveland *R3*				10.10		
So. Chicago *R3*						
Ensley *T2*	5.75	6.725		10.10	6.875	
Fairfield *T2*		6.725			6.875	
Gary *U1*	5.75					
Huntington *C16*		6.50		10.10		
Ind. Harbor *I3*						
Johnstown *B3*		6.725				
Joliet *U1*			7.25			
Kansas City *S2*				10.10		15.35
Lackawanna *B3*	5.75	6.725	7.25		6.875	
Lebanon *B3*			7.25			15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*						14.75
Pittsburgh *J3*				10.10		
Seattle *B2*					6.75	15.85
Steelton *B3*	5.75		7.25		6.875	
Struthers *Y1*				10.10		
Torrance *C7*					6.75	
Williamsport *S5*		6.50				
Youngstown *R3*				10.10		

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.50
Foundry, beehive (f.o.b.)	$18.00 to $18.50
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1958 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9.875	
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor		12.475	
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
16	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12 55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅝ to ⅛-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.00
Midwest	17.00

(Effective Dec. 8, 1958)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190			190	9.00	9.675
Atlanta *A8***	175	192		214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*						9.00	9.55*
Chicago *N4****	173	190	172	212	196	8.65	9.325
Chicago *R3*						9.00	9.55
Cleveland *A6*							
Cleveland *A5*						9.00	
Crawf'dsv. *M4***	175	192		214	198	9.10	9.775
Donora, Pa. *A5*	173	187		212	193	9.00	9.55
Duluth *A5*	173	187		212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187		212	193	9.00	9.55
Galveston *D4*	9.10‡						
Houston *S2*	178	192		217	198	9.25	9.80†
Jacksonville *M4*	184-1	197		219	203	9.10	9.775
Johnstown *B3***	173	190	177		196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9 00	9.55
Kokomo *C9*	175	189		214	195*	9.10	9.65*
L. Angeles *B2****						9.95	10.625
Kansas City *S2**	178	192		217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*					193	8.65	9.325
Palmer, Mass. *W6*						9.30	9.85*
Pittsburg, Cal. *C7*	192	210			213	9.60	10.15
Rankin, Pa. *A5*	173	187			193	9 00	9.55
So. Chicago *R3*	173	187			193	8.65	9.20
S. San Fran. *C6*				236		9.95	10.50†
Sparrows Pt. *B3***	175			214	198	9.10	9.775
Struthers, O. *Y1**						8.65	9.20
Worcester *A5*	179					9 30	9.85
Williamsport *S5*							

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60		
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Britain, Conn. *S7.*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
National Tube	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
Pittsburgh Steel	2	13	40.28	47.21	
	2½	12	54.23	63.57	
	3	12	62.62	73.40	
	3½	11	73.11	85.70	
	4	10	97.08	113.80	

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders	8.10
Cutting and Scarfing Powders	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine ½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller 65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws *Discount (Packages)*

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
¼" diam. and smaller x 6" and shorter	54 / 42
¾", ⅞", and 1" diam. x 6" and shorter	38 / 23
⅝" diam. and smaller x longer than 6"	.. / ..
¾", ⅞", and 1" diam. x longer than 6"	.. / ..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ¼" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk ⅜" diam. & smaller — 25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 500 lb lots	42.25
Electrodeposited	33.25
Brass, 80-20, ball anodes, 2000 lb or more	46.50
Zinc, ball anodes, 2000 lb lots	17.50
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.45
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.15
Nickel salts, single, 100 lb bags	45.00
Nickel chloride, freight allowed, 100 lb	82.25
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 24.15)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.7
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24*	.....	.....	.....	.....
Baltimore	$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99	.....	.....	.....	.....	.....
Boston	.10	9.41	10.50	11.49	9.84	10.12	10.11	10.21	13.45*	16.79	15.79	20.29	19.56
Buffalo	.15	8.40	9.75	11.00	8.90	9.35	9.40	9.30	11.60*	16.34	15.55	19.01	19.30
Chicago	.15	8.40	9.60	10.65	8.66	9.04	9.15	9.14	9.30	16.20	15.20	19.70	18.95
Cincinnati	.15	8.58	9.65	10.70	8.98	9.42	9.71	9.46	11.60*	16.52	15.52	20.02	19.27
Cleveland	.15	8.51	9.60	10.80	8.78	9.28	9.54	9.25	11.40*	16.31	15.31	19.81	19.06
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit	.15	8.66	9.85	11.02	9.03	9.41	9.71	9.45	9.66	15.46	15.48	18.81	19.23
Houston		8.10	8.60	.....	8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles		8.70[3]	11.20-11.80	12.20	9.15	9.10	9.00	9.10	12.95	17.30	16.35	21.30	20.60
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11*	.....	.....	.....	.....
Milwaukee	.15	8.54	9.73	10.79	8.80	9.18	9.37	9.28	9.54	16.34	15.34	19.84	19.09
New York	.10	8.97	10.23	11.20	9.74	9.87	9.84	10.09	13.35*	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.44	9.35	9.25	9.20	9.50	12.05*	16.58	15.58	20.08	19.33
Pittsburgh	.15	8.50-8.60	9.70-9.95	11.05	8.76	9.05	9.15	9.14	11.40*	16.20	15.20	19.70	18.95
Portland		10.00[1]	11.75[2]	13.30[3]	11.95[4]	11.50[5]	11.10[6]	9.85[7]	15.30*	18.50	17.45	20.75	20.25
San Francisco	.10	9.75	11.20	11.40	9.85	10.10	9.95	10.25	13.70	17.05	16.35	21.05	20.60
Seattle		9.95	11.55	12.45	10.00	9.70	9.80	10.10	14.70	17.15	16.80	20.65	20.60
Spokane	.15	10.10	11.70	12.60	10.65	9.85	9.95	10.75	14.85	17.75	16.95	21.55	20.75
St. Louis	.15	8.78	9.98	11.03	9.04	9.42	9.63	9.52	9.93	16.58	15.58	20.08	19.33
St. Paul	.15	8.94	10.19	10.86	8.99	9.45	9.53	9.70[7]	10.16	.....	15.41	.....	19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage.

†† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. [1] 10 ga. x 36" x 120"; [2] 20 ga. x 36" x 120"; [3] 26 ga. x 30" x 96"; [4] 4½" x 1" in lots of 1000 to 9999; [5] sheared plate ¼" x 84" in lots of 1000 to 9999; [6] 3" x 5.70" in lots of 1000 to 9999; [7] M-1020—1-in. rounds in lots of 1000 to 9999; [8] 15 ga. & heavier.

(Effective Dec. 8, 1958)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31 0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	30.25	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	37.25	38.00	41.00	40.50	62.25	47.00	55.75	28.25	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	33.75	33.75	34.25	34.25
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	40.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50-52.75	61.50	32.00	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1* (25¢ per lb. higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8.*

(Effective Dec. 8, 1958)

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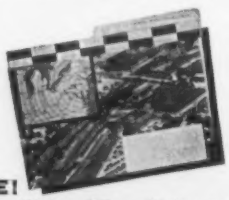

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CONTRACT DIVISION
Textile Machine Works, Dept. 171, Reading, Pa.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Ca, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots $1.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload packed 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:
Carloads, bulk 14.80
Ton lots packed in bags 17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads 34.00
Ton lots 36.00
250 to 1999 lb 38.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.
Carloads bulk 12.80
Ton lots, packed 14.45
Carloads, bulk, delivered, per lb of briquet 15.10
Briquets, packed pallets, 3000 lb up to carloads 16.30

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	24.95	23.65
98% Si, 1.0% Fe	24.45	23.15

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective Dec. 8, 1958)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 50-60% lb, 2 in. x D, delivered per pound contained Cb.
Ton lots $3.90
Less ton lots 3.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.
Ton lots per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.. $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Granal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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Qu.	K.W.	Make	R.P.M.	Volts D.C.	Volts A.C.
3*	3500	Al.Ch.	514	250/700	13,800/6900 4160
1	2000	G.E.	450	132/265	4160/2400
2*	2000	Whse.	720	600	13,800/6900 4160
2	1250	Whse.	720	600	4160/2400
1	1250	G.E.	450	250	4160/2400
2	1000	Whse.	720	600	4160/2400
2	500	Whse.	1200	125/250	4000/2300
1	450	Whse.	900	280/300	2300
3	300	Whse.	1200	125/250	4000/2300
1*	300	Al.Ch.	1200	250/300	2300
3	200	Whse.	1200	125/250	2300
1	150	Whse.	1200	250	2300
1	150	G.E.	1200	250	4000/2300
2	150	Rel.	1200	125	2300

*—3 Unit Sets.

SPECIAL, before removal (1) 1875-K.W. Whse., M.G. Set, Gen. 250-V.D.C., 514 R.P.M. with 2700-H.P. Syn. Motor, 13800/6900/4000-V., 3 ph., 60 cy. with Control.

DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
1**	3000	G.E.	M.P.C.	300/600	250/360
3***	3000	Whse.	Rev.	525/600	600
1**	2200	Whse.	Mill	600	92/132
8**	1500	Whse.	Rev.	525	600
1**	1250	Al.Ch.	Mill	600	300/600
2**	940	S.S.	Mill	600	800/1000
1**	700	Whse.	Mill	600	143
4**	700	Whse.	Rev.	250	300/700
2**	645	S.S.	Mill	300	1000
1	600	Whse.	Mill	250	110/220
2	600	Al.Ch.	Mill	600	300/600
1	400	G.E.	M.P.C.	270	450
1	300	Whse.	Mill	230	300
2	275	Whse.	Q.M.660.6	230	425/850
1	175	G.E.	C.D.175-A	245	800/1025
1	125	Whse.	SK-184	230	575/850
1	125	Whse.	SK-180	230	450/1000
1	100	Rel.	461-T	250	1150/1500
1	100	Whse.	SK-183	230	450/1000
1	100	G.E.	CD-175	230	400/1200
1	80	Rel.	651-T	230	575/1150
1	80	El.Dy.	25-S	230	525/1050
1	50/60	Whse.	SK-131	230	500/1500
1*	50	G.E.	CD-175	230	400/1200
2*	30/40	Whse.	SK-131	230	500/1500

*—T.E.F.C. **—Enclosed Forced Ventilated
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Used Machine Sales Continue Gains

■ Sales of used machine tools continued their recovery in October by climbing 13.3 pct above total sales of September, according to the latest report of the Machinery Dealers National Association.

The rise, while not as spectacular as September's increase of 21.7 pct over August totals, represented a continuing improvement after the drop in August.

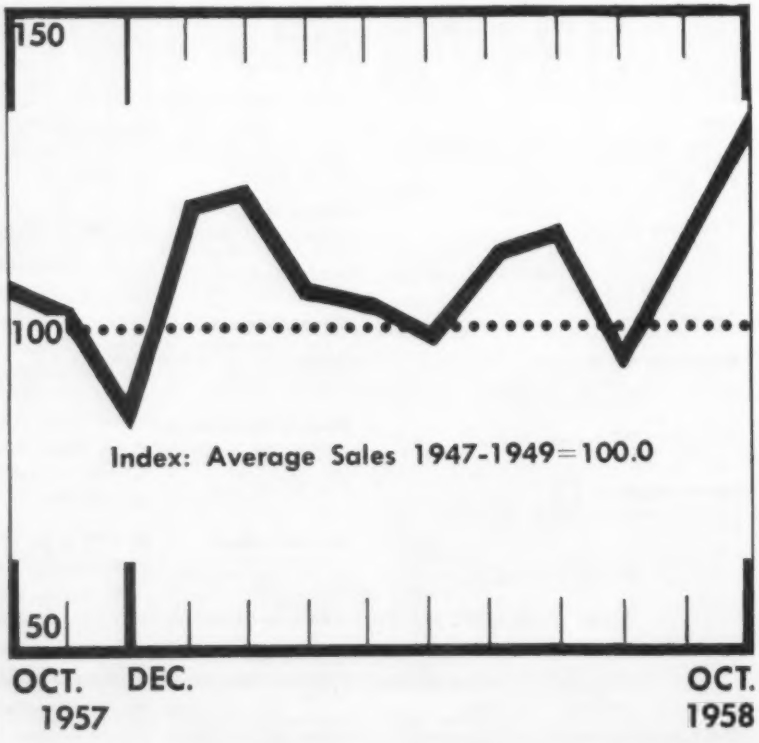
Above Month in '57—October total sales of used machine tools were also a healthy 18.3 pct above totals for October, 1957, MDNA officials said.

The monthly MDNA comparisons showed only one decrease in figures —a 0.9 pct drop in the number of machine tools involved at $200 or more each.

Inventories Rose—At the same time, the dollar value of inventories held by the industry increased 1.2 pct, and the number of units in such inventories increased 7.7 pct.

"We're gratified, of course," says Elmer Pfeil, of Cleveland, president of the MDNA, "that our sales continue to show this healthy growth. But we expect this trend to grow even larger when our new 'master inventory' file of used machine tools is in full operation."

Present sales and inventory figures on members show there is now an all-time high total of units in inventory throughout the industry.



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13' x 3/16" Bertsch Initial Type—NEW
BRAKE—LEAF TYPE
12' x ¼" Dreis & Krump #226
BRAKE—PRESS TYPE
12' x ¼" Airtherm Model No. 3814
CHARGING MACHINE
Salem Brosius 4-wheel Furnace Charging Machine. Charge Boxes 28" x 32" x 76 Inside Measurement
CRANES—OVERHEAD ELECTRIC TRAVELING

7½ ton	P&H	60' Span 230 Volt D.C.
8 ton	P&H	55' Span 230/3/60
10 ton	P&H	50' Span 230 Volt D.C.
10 ton	P&H	39' Span 230 Volt D.C.
10 ton	Milwaukee	57' Span 230 Volt D.C.
10 ton	Shaw	48' Span 230 Volt D.C.
10 ton	Whiting	75' Span 220/3/60 A.C.
10 ton	Shaw	120' Span 230 Volt D.C.
15 ton	P&H	50' Span 230 Volt D.C.
15 ton	Northern	54' Span 230 Volt D.C.
15 ton	Shepard Niles	56' Span 230 Volt D.C.
15 ton	N-B-P	160' Span 220/3/60 A.C.
120 ton	Shepard Niles	77' Span 230/3/60

DRAW BENCHES
3000 lb. Draw Bench, 20 ft. Pull
7000 lb. Draw Bench, 50 ft. Pull—New 1956
10,000 lb. Draw Bench, 50 ft Draw—LATE
FORGING MACHINES
1" to 5" Acme, Ajax, National
HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING 800 lb. to 12,000 lb. Incl.
LEVELERS—ROLLER
12" Waterbury Farrel 9 Rolls 6" Dia.
54" McKay 17 Rolls 4¼" dia.
60" Aetna Standard, 17 Rolls 4⅜" dia.
72" McKay 15 Rolls 4¼" dia.
84" Bliss 17 Rolls 5½" dia.
PLATE DUPLICATOR
#12 Thomas 150 ton Capy. Handles Plate 5' x 16'
PRESSES—HYDRAULIC
300 ton Southwark, Bed 28" x 28", Stroke 25"
500 ton Watson Stillman Piercing Press 48" x 72"
500 ton HPM Fastraverse, Bed 36" x 36"
600 ton Birdsboro, Platen 48 x 48", 15 Stroke
1000 ton HPM Fastraverse, Bed 48" x 72", 36" Stroke
4500 ton B-L-H Bed 68 x 68", Stroke 40"

32' x ¾" BALDWIN PYRAMID TYPE BENDING ROLL
Air Actuated Drop End
2 Motors—60 & 40 H.P. A.C.
NEW 1942

PUNCH—BEAM
#14 Thomas Guillotine Type 225 ton Capy.
With 50 ft. Spacing Tables
ROLLING MILLS
6" x 5" Torrington Flat Wire Mill Line
2½" x 9" x 9" 4-High Strip Mill
3¼" x 7" Six Roll Cluster Mill
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Single Stand Two High
20" x 36" Single Stand Two High
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6 Stand Dahlstrom #450-6 for stock to 4½" wide up to 11 Ga.
18 Stand Custom Built, 2½ Shaft, will take 36" wide
ROLLS—PLATE STRAIGHTENERS
100 Bertsch Seven Rolls 9" Dia.
72" Niles 7 Rolls 9" Dia. Motor Driven
SHEAR—ANGLE
6 x 6 x ⅝" Hilles & Jones
SHEAR LINES
36" x .020 Ga. Hallden Shear Line
96" Cleveland, Capy. 14 Ga. Pay Off & Tables
SHEARS—SQUARING
6' x 14 Ga. Edwards, Motor Drive—LATE
8' x ¼" Niagara No. 8E
10' x ⅜" Niagara
SLITTERS
30" Yoder M-2-½ Slitting Line
36" Yoder, 4½" Dia. Arbor
STRAIGHTENERS
Torrington #1734 12-Roll, Capy. 1¾" Rd. 1-9/16"
#4—12¼ Littell Indexing, Feeding & Straightening Machine, Capacity .062" x 12" in SAE 1010 Steel
SWAGING MACHINES
#4A Standard 2-Die, Capy. 2¼" Tube
#6"A Fenn Capacity 3⅜ Tube 1¼" Solid
10" Die Length Hydraulic Feed, LATE
TESTING MACHINES
20,000 lb. Baldwin Univ. Hydraulic
50,000 lb. Baldwin Southwark Compression
60,000 lb. Olsen Univ. Hydraulic
100,000 lb. Olsen Universal Beam Type
500,000 lb. Olsen Super DeLuxe Compression
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BG-22, 5' x 10' Complete (1953)
BG-3, 6' x 12' Rebuilt (1942)
BG-1's, 3' x 5' & 3' x 8' (1932)

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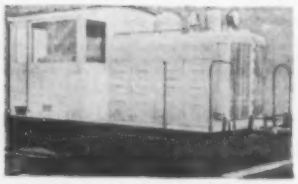

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A

*Acheson Colloids Co. 139
Acme Iron & Metal Co. 184
Ajax Electric Motor Co. 183
*Allied Research Products, Inc. ... 110
Alten Foundry & Machine Works, Inc. 149
Aluminum Co. of America ... 38 & 39
American Hoist & Derrick Co. ... 59
*American Pulverizer Co. 145
American Smelting & Refining Co. Continuous-Cast Products Department 47
American Smelting & Refining Co. Federated Metals Division 83
American Steel & Wire Div., United States Steel Corp. 32 & 33, 85
*Armstrong-Blum Manufacturing Co. 112

B

Baldwin-Lima-Hamilton Corp., Standard Steel Works Div. 70
Belyea Co., Inc. 182
Bethlehem Steel Co. 1
Birdsboro Steel Foundry & Machine Co. 21
Bristol Brass Corp., The 67
*Buffalo Forge Co. 71
Bullard Co., The 64
Byers, A. M., Co. 74

C

Canton Drop Forging & Mfg. Co., The 186
Carlson, G. O., Inc. 81
*Carlstrom Pressed Metal Co. 150
Chase Brass & Copper Co., Inc. 68
Chicago Electric Co. 183
Cincinnati Gear Co., The 156
Cities Service Oil Co. 69
*Cleveland Worm & Gear Co. .. 88
*Colorado Fuel & Iron Corp., The Wickwire Spencer Steel Div. ... 178
Columbia-Geneva Steel Div., United States Steel Corp. 32 & 33, 57, 85
Consumers Steel & Supply Company 184
*Cromwell Paper Co. 102
Crucible Steel Co. of America .. 53
*Cullen-Friestedt Co. 165
Curry, Albert, & Co., Inc. 182

D

Decatur Casting Co. 150
*Dempster Brothers, Inc. 157
Detroit Steel Corp. 14
De Vlieg Machine Co. ..... 48 & 49
*Dodge Manufacturing Corp. 54
*Duraloy Co., The 143

E

Eastern Machinery Co., The 183
Electric Equipment Co. 182
Electro Metallurgical Co. Division of Union Carbide Corp. 26
*Electronic Control Systems Division of Stromberg-Carlson 99
*Erie Bolt & Nut Co. 142
Erie Forge & Steel Corporation 17, 18, 19 & 20
Erie Foundry Co. 4
Eveready Supply Co. 184

F

Falk Machinery Co. 181
Federal Machine & Welder Co. .. 75
*Feller Engineering Co. 31
Foster, Frank B., Inc. 182
Frank, M. K. 181

G

General Refractories Co. 65
*Gerrard, A. J. & Co. 160
*Gisholt Machine Co. 80
Globe Steel Abrasive Co., The .. 117
Goss & De-Leeuw Machine Co. .. 185

H

Hallden Machine Co., The 86
Hendrick Manufacturing Co. 144
Henry, A. T., & Company, Inc. ... 181
*Hobart Brothers Company 10
*Hooker Chemical Corporation .. 78
*Houghton, E. F., & Co. 56
Hughes, Arnold, Co. ..... 181 & 184
Hussey, C. G., & Co. 108
Hyman, Joseph, & Sons 182

I

Innocenti Corporation ..... 76 & 77
*International Research & Development Corp. 16
Iron & Steel Products, Inc. 180

J

Jomac, Inc. 13

K

Kaiser Engineers 137
Kaiser Steel Corp. 184
*Kenco Manufacturing Co. 140
Keokuk Electro-Metals Co. 118
*Kinnear Manufacturing Co., The 159

L

Lamson & Sessions Co., The 55
Lang Machinery Co., Inc. 182
Leeds & Northrup Co. 82
Lilly, Eli, & Company ..... 22 & 23
Linde Co., Division of Union Carbide Corp. 66
Luria Bros. & Co., Inc. 169

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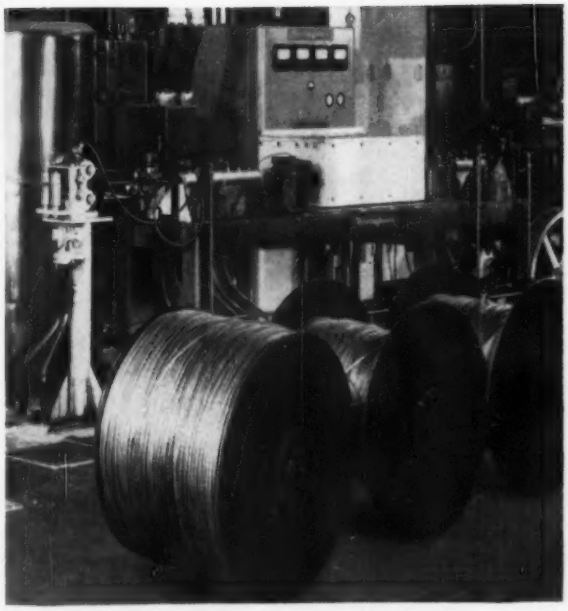

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ADVERTISERS IN THIS ISSUE

An asterisk beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturer for your copies today.

M

MacCabe, T. B., Co. 180
*Magnaflux Corporation 119
Manhattan Rubber Div., Raybestos-Manhattan, Inc. ..... 34 & 35
*Marchant, Geo. F., Co. 144
Mesta Machine Co. Inside Front Cover
*Metal & Thermit Corp. 104
Miles Machinery Co. 182
Miller Electric Mfg. Co., Inc. 158
Minster Machine Co., The 52
Murphy Machinery, Inc. 184

N

National Acme Co., The .... 40 & 41
National Machinery Exchange .. 181
National Steel Corp. 61
National Tube Div., United States Steel Corp. 85
New Departure Div., General Motors Corp. 8
*Norton Co., Rrefractories Div. 60

O

Ohio Ferro-Alloys Corp. 5
Oliver Corp., The, A. B. Farquhar Division 15
Orton Crane & Shovel Co., The . 167
Osborn Mfg. Co., The Machine Division ..... 36 & 37
Owen Bucket Co., The 152

P

*Pannier Corporation, The 152
Parker Rust Proof Co. .....42 & 43
Parker Steel Company 184
*Pittsburgh Induction Heating Co., Inc. 73
Platt Bros. & Co., The 185
Public Sales, Inc. 182
Purdy Company, The 183

R

Ransom, H. R. & Co. 183
*Raybestos-Manhattan, Inc., Manhattan Rubber Div. .....34 & 35
*Republic Steel Corp. .....44 & 45
*Revere Copper & Brass, Inc. 152
*Rhode Island Tool Co. 140
Rollway Bearing Co., Inc. 84

S

Salem-Brosius, Inc. 115
Sandusky Foundry & Machine Co. 58
*Sciaky Bros., Inc. 120
Sharon Steel Corp. 6
Signode Steel Strapping Co. 24 & 25
Southern Screw Co. 11
*Standard Conveyor Co. 141
Standard Steel Works Div., The Baldwin-Lima-Hamilton Corp... 70

T

Tennessee Coal & Iron Div., United States Steel Corp. 32 & 33, 57, 85
Textile Machine Works 178
Thrall Car Mfg. Co. 183
Timken Roller Bearing Co., The .. 106
Tubular Rivet & Stud Company 146 & 147

U

Union Carbide Corp., Electro Metallurgical Division 26
Union Carbide Corp., Linde Division 66
United States Steel Export Co. 32 & 33, 57, 85
*United States Steel Corp. 32 & 33, 57, 85
United States Steel Supply Div., United States Steel Corp. 57, 85

V

Valley Mould & Iron Corp. 163
Valvair Corporation Division of International Basic Economy Corp. 46
Verson Allsteel Press Co. . Back Cover
Voss Engineering Co. 50

W

Wallack Bros. 191
Waterbury-Farrel Foundry & Machine Co. 100
Wean Engineering Co., Inc., The 79
*Weirton Steel Co. 61
Weiss Steel Co., Inc. 184
Westinghouse Electric Corp. 27, 28, 29, 30, 151
Westinghouse Electric Corp., Induction Heating Dept. 185
Wheeling Steel Corp. 186
*Whiting Corporation 12
*Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp.... 178
Wilson, Lee, Engineering Co., Inc. .....Inside Back Cover

Y

*Yoder Co., The 148
Youngstown Sheet & Tube Co., The 51

CLASSIFIED SECTION

Clearing House 180-184
Contract Manufacturing Appears in first and third issue of each month. See Nov. 20 & Dec. 4
Employment Exchange 184
Equipment & Materials Wanted.. 184

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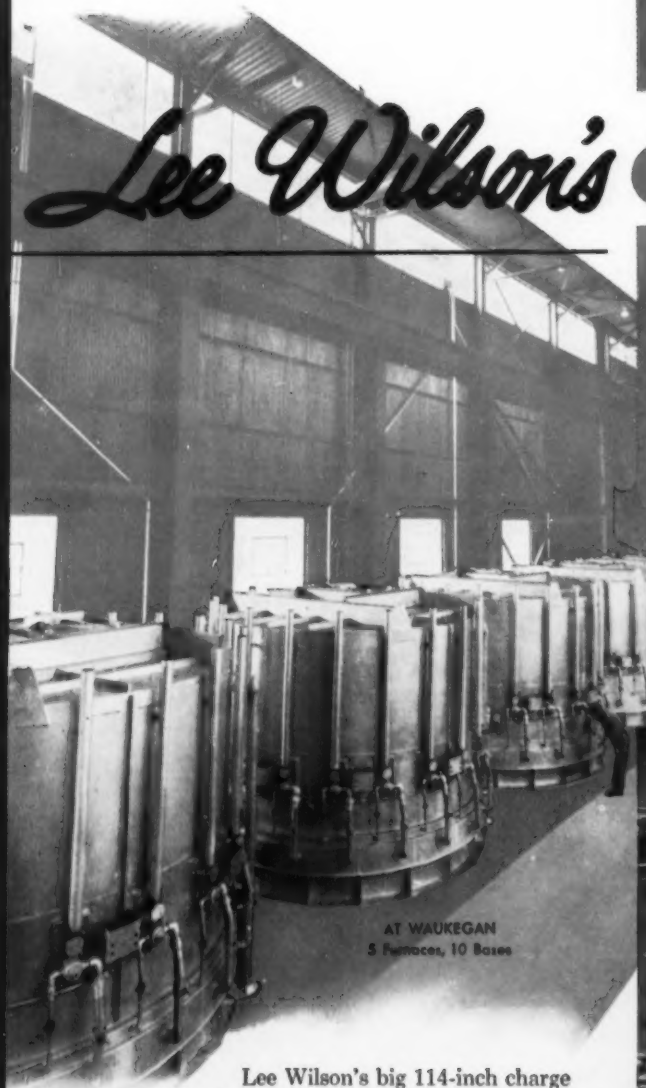

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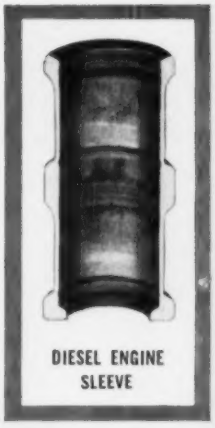
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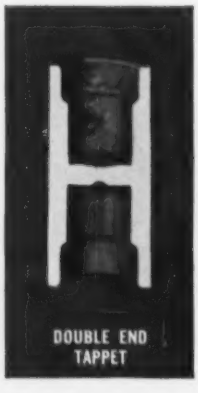
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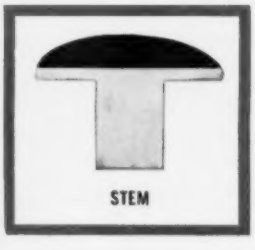
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